A

PHILOSOPHICAL SURVEY

OF THE

ANIMAL CREATION.

BRITISH MUSEUM

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OF THE
ANIMAL CREATION,

K

AN ESSAY.

WHEREIN

The general Devaſtation and Carnage that reign among the different Claſſes of Animals are conſidered in a new Point of View; and the vaſt Increaſe of Life and Enjoyment derived to the Whole from this Inſtitution of Nature is clearly demonſtrated.

Tranſlated from the FRENCH.

> All Diſcord Harmony, rightly underſtood;
> All partial Evil univerſal Good. POPE.

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PREFACE.

NOTHING contributes ſo much to the welfare of men, as the progreſs they make in the ſtudy of nature. Other reſearches may ſerve to amuſe, but thoſe which have for their object the actual ſtate of things, their properties, tendency, order, and connection, beſides the amuſement they afford, lay a foundation for very uſeful diſcoveries relative to the neceſſities and conveniences of life.—As all the powers of nature are ſubject to fixt, immutable laws, and neceſſarily produce their effects, they muſt of conſequence contribute to the happineſs of men, whereever men have ſkill enough to direct them to ſuch an end; this they are taught to a certain degree by the ſtudy of nature. And accordingly we find that in proportion to the proficiency they have made in this ſtudy, mankind have abridged the miſeries of life, and multiplied the means of providing for a comfortable ſubſiſtence.——There is another advantage alſo derived from this ſtudy, not inferior to the preceding. By diſcovering the connection that neceſſarily ſubſiſts betwixt the different claſſes of beings, and the general laws by which they all conſpire to one principal end, it conveys thoſe enlarged conceptions to the underſtanding which alone can enable us to form juſt ideas of the Deity. By fixing the attention upon things as they actually exiſt, and upon thoſe alone, it inſpires an invariable love of truth, which is only to be acquired by the contemplation of her, and which is the only effectual barrier againſt thoſe floods of error that univerſally deluge the human underſtanding. From hence ariſes alſo in the mind a certain confidence in the plan of nature; for in proportion as the natural cauſes of things and of events unvail themſelves to our eyes, the phantoms of our imagination vaniſh. We behold only one ſelf-exiſtent Being animating and governing the ſyſtem of the world, and who unites to infinite power, thoſe tranſcendently amiable attributes, wiſdom and goodneſs; not a partial and capricious goodneſs, but a beneficence that pours forth its bleſſings in every age, and in every place. The rule of his diſpenſations is the felicity of the univerſe; the limits of them—eternity.

Without ſome degree of acquaintance with the operations of nature, we are apt to be continually alarmed at the appearances they produce. A number of unexpected phænomena, which threaten immediate deſtruction to the world, ſuggeſt every moment to the mind, the ideas of an incenſed Deity, who muſt be appeaſed at all events. This has given riſe to the moſt ridiculous practices; for when our judgments are under the influence of fear alone, there is no abſurdity too great for us to commit. And indeed what can be a greater abſurdity than to dread the Supreme Being as an auſtere maſter, who exacts of his creatures ſervices beyond their ſtrength, and yet, upon this account is continually diſſatisfied with thoſe which they offer him: or to aſſociate with him in the government of the world, a multitude of agents, whoſe only pleaſure and only employment it is to trouble the repoſe of mortals. And yet ſuch are the ſentiments of thoſe, who, through an ignorance of the powers with which infinite wiſdom has animated ſecond cauſes, regard every extraordinary effect produced by them, as ſo many adverſe ſtrokes, inflicted by ſome inviſible hand, jealous of our happineſs. Their minds, who conſider every thing as ominous, being agitated with continual fears, are always prepared to ſubmit to the ſervile yoke of falſehood and impoſture. Religion, naturally the ſource of tranquillity and joy, becomes to ſuch the perpetual ſource of alarms and inquietude. Ignorance is the parent of ſuperſtition; and ſuperſtition renders men the moſt feeble, and the moſt ridiculous of beings.

The ſtudy of nature, therefore, cannot be too ſtrongly enforced upon men. From hence it is that we learn to acknowledge a Providence, and to conſider every event as the neceſſary conſequence of the laws ſhe has eſtabliſhed, to maintain the order of the univerſe, and unite together its various parts. And we accordingly find that theſe ſtudies have, in every age, engaged the attention of philoſophers; whereas thoſe who are no philoſophers have perpetually run after ſhadows, thought that they ſaw when they ſaw not; that they heard when they heard not, and that they knew a great deal when they knew nothing; or, which amounts

mounts to the ſame, when all their knowledge conſiſted in certain dreams, of which they were very tenacious, though it were better they had been forgot.

There can be no genuine knowledge, or worthy our purſuits, that is not founded upon a juſt conception of things; and this can only be obtained by an inquiry into the truth of things. Numbers, however, inſtead of obſerving theſe rules of acquiring knowledge, have invented principles, and adopted hypotheſes, by which they pretend to judge of every thing, without taking the trouble to examine the minuteſt as it is in itſelf, that is, by the ſenſes and experiments. By theſe means the world (the creatures it contains) have taken in their conceptions quite in a different form and deſtination to what God has in reality given them; and it is this imaginary ſyſtem that they make the object of their ſtudy and contemplation: it is here that they ſpin at leiſure their curious obſervations: it is from hence they draw their diſcoveries, their conjectures, their probabilities, and the whole parade of their knowledge. While others again, ſtill more infatuated, collect with care all theſe chimerical notions, and inceſſantly labour to make them harmonize, I ſay not with facts, but with other ideas full as chimerical.

When nature is the object of our attention, the principles we have juſt laid down, are the only rules that can lead us into an acquaintance with things as they actually exiſt. And it is a happineſs that men have begun at length to perceive their importance, and require their evidence before they will paſs a verdict. The hypothetic gentry begin to be diſreguarded: their writings, like a ſolitary wreck which the mariner deſcries upon ſome diſtant ſhoal, ſerve only to admoniſh us, this is not the courſe you are to ſteer, if you would arrive at the deſired haven.

Nature preſents to our minds an infinite variety of objects, all of which are equally calculated to amuſe and inſtruct. But what ſtrikes us the moſt is that immenſe quantity of life with which the whole creation ſwarms. What an innumerable multitude of beings ſhare with us the privilege of life, ſenſation, and enjoyment, and are equally, with ourſelves, under the protection of an attentive Providence.

How various their ſhapes and figures! How different their inſtincts! What fire in their temperaments, what life in their gait, and agility in all their movements! And yet what an inſatiable thirſt to deſtroy each other! Various are their changes, numerous their revolutions, but what a juſt proportion and uniformity is ſtill preſerved in their numbers! Animal life may, in ſome reſpects, be compared to a fire, which conſumes, but does not extinguiſh itſelf: like the Hydra or Vertumnus in the fable, it diveſts itſelf of one form only to aſſume another. In other reſpects it reſembles a rude torrent that rolls headlong from a lofty mountain, and though it falls into its proper channel, yet it is reſtleſs and turbulent, till it has acquired an equality with itſelf. Theſe appearances certainly merit the attention of a ſtudious mind: and he that carefully examines the reaſons, will diſcover light dawning upon the whole plan of creation. The beautiful labyrinths of nature will preſent, at every turn, ſuch openings to his admiring eyes, as ſhall convince him of the exiſtence of a Being infinite in wiſdom and in power.

Theſe different phænomena in animal life have for ſome time employed our ſtudies, and we have attempted to diſcover thoſe marks of order and wiſdom which characterize the productions of Omnipotence; and whatever others may alledge, we have found that they are not altogether beyond the ken of human intelligence. With reſpect to the oppoſition that reigns betwixt creatures of different ſpecies, Monſ. Buffon, and other naturaliſts, have already remarked, that it was productive of conſequences equally juſt and uſeful. But they have only pointed out the truth; we ſhall venture to carry our thoughts upon this important ſubject ſomewhat further; and ſhall attempt, at the ſame time, to elucidate ſome other properties of the animal ſyſtem. It is our ambition to encourage and aſſiſt the inquiſitive, to advance one ſtep more in the knowledge of the truth. Such a deſign will ſurely ſecure their attention; and we flatter ourſelves that the manner in which it is executed, will not render us unworthy of it. We have not any recent diſcoveries in natural hiſtory to communicate: thoſe that we ſhall recite are univerſally known; yet the point of view in which we ſhall place them, will, perhaps, appear new to every one. The great variety of forms and ſpecies which reigns throughout the animal ſyſtem, is for example obvious to all; yet they are ignorant of the purpoſes to be anſwered by it. It is generally imagined, that the perfection of our ſyſtem conſiſts in a certain chain which unites, by imperceptible gradations, the loweſt ſpecies to the moſt exalted; and to the meer ſtructure of this chain has the whole plan of Providence been confined. But we ſhall ſee that its deſigns are much more noble and beneficient—Women and children can tell us, that animals are ſubject to accidents, that they produce, and devour one another; yet few philoſophers know that there is an intimate and indiſpenſible connection betwixt theſe; and that without their union animal life, and of conſequence enjoyment, could not take place: and as ſome of them glory in their ignorance in this reſpect, and take occaſion from hence to ridicule the belief of a being ſupremely good and wiſe, who preſides over the government of this world, it cannot be improper to enter into ſome particulars upon the ſubject. This Eſſay at leaſt may ſerve as an introduction for thoſe who intend to make natural hiſtory their ſtudy. They will here ſee all the different ſpecies of animals aſſembled as it were in one point of view; and they will learn to refer the nature, and different properties of each to general ends, productive of the good of the whole.

We ſhall divide the ſubject into three parts. In the firſt we ſhall treat of the nature of life in general, its ends, extent, and variety. In the ſecond,

cond, we ſhall conſider the oppoſition in which it is with itſelf, and the advantages of this oppoſition. And in the third, after we have anſwered the objections which may be made to our theory, we ſhall treat of the law of multiplication, its origin, and effects.

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PART THE FIRST.

SECTION I.

Obſervations concerning the Nature of Animal Life.

IT is difficult to determine the nature of animal life. This is manifeſt however, that it cannot exiſt without certain organized parts, and that it poſſeſſes greater degrees of vigor, in proportion as this organization is compleat. By attentively examining animal ſubſtances we ſhall learn, that they do not conſiſt of a confus'd maſs of materials heaped together, without choice and without diſtinction;

tion; but that they form, throughout their whole extent, an aſſemblage of parts exquiſitely finiſhed and wonderfully combined, ſo as to conſtitute a complete whole. They are divided into ſolids and fluids. The ſolids comprehend the nerves, arteries, veins, muſcles, tendons, cartilages, glands, inteſtines, or in a word the fleſh and bones. Amongſt the fluids are conſider'd the chyle, blood, lymph, bile, animal ſpirits, and a variety of other humors, contained in the ſubſtance of the glands. Theſe different parts of animated bodies are deſtined to ſome particular uſe. They poſſeſs the preciſe configuration, ſize, weight, flexibility, and in ſhort all the qualities requiſite for their deſtination. None of them exiſt independent of the reſt, but they have all an intimate connection with each other, and preſerve themſelves in perpetual motion by maintaining their due ballance, and reciprocal action. The ſolids, continually contracting and dilating promote the circulation of the blood through all parts of the body. The fluids, after they have paſſed thro' their fermentation, and been filtrated through the glands of the brain, are returned by means of the nerves to the ſolids, and communicate to them their proper powers of motion.

We have aſſerted that the life of animated bodies, poſſeſſes greater degrees of force and perfection in proportion as their organization is compleat. And we find in fact that an equal ſhare of vivacity and fire is not conferred indiſcriminately upon all the different ſpecies, but that thoſe enjoy the greater portion whoſe organs are the moſt delicate, mobile and complicate. We find, that life in individuals of the ſame ſpecies, becomes more or leſs ſportive and vigorous, according as their organs are in a ſtate of developement or of decay. How great the difference in this reſpect betwixt the fœtus, and an animal arrived to full maturity! And we find further, that whenever any of the principal organs are out of order, by which their proper action is ſuſpended, a ceſſation of life immediately enſues.

This cloſe harmony between the life and organization of bodies, has induced ſome philoſophers *(a)* to imagine, that life is no other than a certain combination of organs, which are kept in a perpetual motion by mutually acting upon each other.

But this ſentiment ſeems to confound life with motion; two things which are very diſtinct in the ideas of every man, as indeed they are in themſelves. The motion of a body, let it be what kind of motion you pleaſe, will have no effect upon the nature and properties of that body:

(a) See the philoſophical Works of Le Clerc. Tom. iv.

body: it merely changes its poſition relative to another body: and there is an immenſe difference betwixt this idea and the idea of ſenſibility, which conſtitutes one of the moſt eſſential qualities of animal life. We muſt therefore ſeek the principle of its exiſtence elſewhere. Some have placed it in the heat which is univerſally communicated to animal bodies. Mr. Buffon ſuppoſes that there are organized and living molecules, which continually paſs from one body to another, and which, according to him, conſtitute the incorruptible germe of animal life. Could conjectures ſatisfy us we ſhould not heſitate to place it in the rank of elements; and we might obſerve, that, conſidering it as a ſubſtance, it has a ſtrong reſemblance to fire. Should any one aſk, in what this reſemblance conſiſts, I could anſwer, that as fire is kindled by fire, thus does life generate life: that weak and wavering in its riſe, active and impetuous in the midſt of its career, languid and exhauſted at the cloſe, the progreſs of a *living* is exactly ſimilar to that of an *inflamed* ſubſtance: this at firſt is but a ſpark, a glimmering light, ſcarce able to ſupport itſelf; by ſpreading, it changes into an impetuous flame, and after having ſurprized us with its luſtre, it is ſpent and extinguiſhed of itſelf: we might add, that as inflammable ſubſtances require a perpetual ſupply of fuel, thus the living ſubſtance cannot ſubſiſt without conſtant ſupplies of nouriſhment: that as fire ſeizes and conſumes whatever is its proper aliment, thus does animal life fix upon and devour whatever affords it ſuſtenance: that as fire may be extinguiſhed by too large a quantity of combuſtible materials, as well as by the want of them, thus may a ſuperfluous quantity, as well as a deficiency of food, prove equally prejudicial to life: that thoſe materials which produce the moſt violent effects upon living bodies, (as certain ſpirits for example) have preciſely the ſame influence upon inflamed ones: that each require air for their ſupport, and that air which has already paſſed through the fire, and thereby loſt its nutritive ſalts, is equally pernicious to both. In a word, we might remark, that it is only by the kindly influence of heat that a living body experiences the firſt expanſion of its germe; it is this which rears it to its ſummit of perfection, and after having introduced them into being, it acts the part of a nurſe and phyſician to animated bodies, in preſerving the requiſite flexibility of their fibres, and motion of their fluids.

If, I ſay, we could content ourſelves with conjectures, we might call life an element, and as ſuch compare it with fire: but this is by no means our deſign; we propoſe to reaſon from propoſitions capable of a much ſtronger degree of evidence.

SECT. II.

Life is the grand Deſign of the Creation.

WHATEVER may conſtitute the living principle of animals, it is clearly manifeſt that the production of life is the moſt noble effort of omnipotence, and the center in which all its other operations terminate. To create meer inanimate beings, is unworthy of a Diety. As matter is incapable of life, the exiſtence of ſuch beings, does not reflect the leaſt idea of perfection in the ſupremely intelligent mind. Neither is there any increaſe of happineſs derived to others from hence; and it is an abſurdity to imagine that a Being, compleatly happy in himſelf, ſhould act from any other motive. God has therefore peopled the univerſe with inhabitants; and the inanimate parts of which it is compoſed, exiſt for no other end than to prove conducive to the conſervation of the animate. Nor is the air, earth, and ſeas alone ſubſervient to this purpoſe, but the celeſtial bodies, alſo; not only the celeſtial bodies which compoſe our ſyſtem, but the whole conſtellation that glitters in the firmament.

Though we ſpeak in this language we do not forget that the ways of providence are incomprehenſible; but we imagine that this incomprehenſibility is confined to the means employed for the accompliſhment of her deſigns; as to theſe deſigns themſelves, it appears to us with all the force of demonſtration, that they immediately relate to the production and conſervation of the greateſt poſſible good in the univerſe; and that he who ſuppoſes any other, entertains ideas utterly unworthy of them.

Some imagine that every thing in the

creation has an ultimate reference to man, and that God exerts his plaſtic power for man alone. But ſuch notions ought not to be retained, without retaining the curious ſyſtem that gave them birth. They might paſs when men, even the wiſeſt of them, were weak enough to believe that the earth was an immenſe plain, ſituated in the centre of the univerſe: that the vault of heaven was of chryſtal: that the ſun was no other than a plate of red hot iron, about as large as the Peloponneſus; but as human nature now bluſhes at theſe errors, ſhe ought to bluſh a deeper dye at ingroſſing the whole plan of providence to herſelf. Will any one aſſert that the univerſe exiſts, meerly for the contemplation of ſuperior intelligences? But what ideas muſt we form of the ſupreme Being, to imagine that he exhibits the wonders of his power, only to divert ſome of his creatures? And what conceptions muſt we entertain of theſe intelligent beings themſelves,

ſelves, to ſuppoſe that they can contemplate with any degree of pleaſure works, which, though great and marvellous, are ſtill barren and futile, while they might have been the ſeat of life and happineſs.

There is no doubt therefore but that life is the principal deſign of the creation, and of conſequence there muſt be, as the wiſeſt philoſophers have imagined, a plurality of worlds. The fixed ſtars are as ſo many ſuns, which, with the bodies they illuminate and preſerve in their orbits, form ſo many ſyſtems, ſimilar to that of which our world is a part. And let any one reflect upon the number of theſe ſtars, the multitudes that are viſible to our eyes, the multitudes that are inviſible: let him aſcribe to each of them a certain number of planets, to theſe planets, Satellites, and to all theſe bodies, inhabitants in proportion to their ſize, and then calculate if he is able the quantity of life which the univerſe contains!

SECT. III.

Of the Quantity of Life on the Earth.

PROVIDENCE ſeems to have advanced to the utmoſt verge of poſſibility in the gift of life conferred upon animated beings. That plenitude of exiſtence which is obſervable upon the earth, ſufficiently confirms this opinion, for it every where appears with a moſt aſtoniſhing profuſion. The human race which occupies ſuch a wide extent, and is divided into ſo many different nations; the human race I ſay conſtitutes but a part of the inhabitants deſtined to people our globe. Nor is it the moſt conſiderable part. There are ſpecies more numerous than ours. This appears to be the caſe with thoſe inſects whoſe immenſe ſwarms ſeem to convert the elements they inhabit into one continued web of life, and in whoſe natures the vital fire burns with no leſs vigor than in our own. Some naturaliſts have attempted to enumerate the different ſpecies that inhabit the earth. But their calculation, ſuppoſe it juſt, muſt be confined to certain countries, or at moſt to thoſe animals which are obvious to our ſight; for what numbers are there, which either from their extream minuteneſs, or the places they inhabit, elude our inſpection! Let it ſuffice to obſerve that there is not a ſpot, however remote, or bad its ſituation, whether in the extreams of heat or cold, dryneſs or humidity, that is without inhabitants; and thoſe places which are the leaſt acceſſible to the human ſpecies, poſſeſs perhaps the greateſt abundance. There are countries, where the vital ſubſtance fermenting as it were into life by the heat of the ſun, breaks forth precipitately from its matrix, and ſpreads with a kind of fury over the whole land.—There are countries where the earth is totally covered with reptiles, where the air is obſcured with innumerable multitudes of winged inſects. The confuſed cries of an immenſe aſſemblage of animals of different ſpecies, the luſtre of their attire, and their perpetual agitation, ſeem to have metamorphoſed extenſive foreſts into one animated maſs. In a word, there are countries where men, and the animals deſtined to their uſe, appear ſuperfluous, through that immenſe quantity of life which the earth otherways ſupports. The inhabitants of Carthagena are obliged to defend themſelves every moment againſt the attacks of a multitude of reptiles and inſects. Amongſt theſe are the Moſchetos, and Culebrillæ, which lodge in their ſkin, and occaſion ulcers and ſometimes gangrenes. The horſes and wild aſſes have their feet painted red, as it were, with theſe cruel inſects. At Porto-Bello, ſuch an aſtoniſhing quantity of large toads come out of the woods after a ſhower of rain, that it is impoſſible to walk without trampling upon ſome of theſe animals, and expoſing yourſelf to their venemous bite. At Guyaquil, the houſes are filled with Snakes, Vipers, Scorpions, and Scolopendræ, which creep into every part. It is dangerous for the inhabitants to go to reſt, without firſt examining their beds, and ſcreening themſelves with ſome kind of canopy or tent. The air likewiſe in theſe places is ſo infeſted with volatile inſects, that it is impoſſible to keep a candle lighted for the ſpace of three minutes; or to approach it while burning, without having your eyes, noſtrils, mouth and ears, immediately filled with ſwarms of them. We were greatly harraſſed, ſays Don *Uloa*, whilſt we were in this city, in making our obſervations upon the heavenly bodies by night: for on one ſide, we were expoſed to the ſtings of a multitude of inſects; and on the other, we could ſcarcely ſee or breathe on account of them. So great is the abundance of life which the warmer climates produce! And although there are fewer inhabitants in the colder regions, yet we may aſſert, that they are in proportion to the quantity of nouriſhment the earth affords: and that this quantity is more or leſs abundant, according to their ſituation, and the degrees of heat to which they are expoſed. But ſince it is impoſſible that all parts of the globe ſhould have preciſely the ſame poſition, and as every part has ſuch a poſition as is beſt calculated to produce the greateſt quantity of life poſſible, we may aſſert, that if the abſolute number of inhabitants is not ſo great as it might have been, it is nevertheleſs always approaching towards its plenitude. Suppoſe that the ecliptic made with the equinoxial line an angle of 43 degrees, inſtead of 23, three parts of the globe would be uninhabitable: for the tropics, conſidering them in the ſame ſituation as they are at preſent, would then experience in the ſpace of a year, all the heat of the torrid zone, and all the cold of the frigid: but there is no plant or animal that could ſuſtain theſe two extremes. Was the plain of the ecliptic the ſame as the equator, or were they parallel, it is again manifeſt that the greateſt part of the globe would be deſtitute of ſummer, conſequently of harveſt; or, which returns to the ſame thing, without inhabitants.

We acknowledge that there are deſerts; but who will aſſure us that theſe are not to the habitable parts, the ſame as openings and ſquares are to large cities; that are deſigned to preſerve the air in a ſtate of purity, which it muſt doubtleſs loſe, was every part to be equally inhabited? Or, who will aſſure us, that they are totally deſtitute of inhabitants; ſince a celebrated naturaliſt relates, that having minutely examined the ſand in the deſerts of Egypt, he diſcovered ſeveral of the known ſpecies of inſects, and others hitherto unknown?

known? But ſuppoſing them deſtitute, it is extremely probable that thoſe vaſt beds of ſand, which extend themſelves from the further extremities of Africa to the centre of Aſia, have ſtill their utility with reſpect to life; either by forming voids, where the atmoſphere may recover its elaſticity, and other qualities it might have loſt, were every part equally full of life; or by being neceſſary to reflect with greater luſtre the light deſtined to illuminate the world. It is true alſo, that there are large tracts of land which lie uncultivated; but we are not to imagine that agriculture univerſally contributes to the increaſe of exiſtence. There are ſome countries, where it is at leaſt doubtful, whether it does not leſſen the quantity. Thoſe for example, that abound with a kind of inſect, which agriculture requires to be deſtroyed; and which, in fact, is extirpated by the frequent tillage of the ſoil. For one ſpecies, to which the cultivation of ſome of the foreſts in America might be favourable, there are ten, perhaps, to which it would prove fatal.

The world, we ſay, contains an immenſe quantity of living creatures; and it appears from experiment, that notwithſtanding the innumerable multitude of thoſe that preſent themſelves to our ſight, we ſee but a part, and that a very ſmall part of the animal creation. When we examine nature through the microſcope, what an aſtoniſhing ſpectacle! Life iſſues with profuſion from the ſmalleſt objects! A blade of graſs, a drop of the pureſt water, contains thouſands of millions of beings that are furniſhed with organs, that live, move, and ſport amongſt themſelves! And if we examine into their origin, it appears without a doubt, that they proceed from an innumerable multitude of inſects floating in the air: ſo that we have the greateſt reaſon to believe that the whole atmoſphere is impregnated with life.

This aſtoniſhing extent of animal life doubtleſs, requires for its production, and ſtill more for its conſervation, an infinitude of arrangements, combinations, and reſources; and Providence has accordingly made particular proviſion for each. This is another mark, by which we may know the true and only deſign of the creation.

SECT. IV.

Of the Variety obſervable in Animal Life.

PERMIT us here to ſcrutinize the conduct of the moſt High, by the light of impartial and uncorrupted reaſon. Reaſon is an emanation from his wiſdom, and we clearly ſee that he has followed its deciſions in the creation of his works. This is a light which cannot prove fallacious. Whatever true reaſon repreſents to us as juſt, wiſe, and rational, muſt be ſo. Let us then enquire what it was previouſly neceſſary for ſovereign power to effect, in order to repleniſh the earth with that multitude of inhabitants it contains; or rather to cover it, as it were, with a living ſubſtance.

1. As the fruits of the earth are the baſis of this ſubſtance, it was firſt neceſſary that the earth ſhould produce them in immenſe quantities; and as there is an infinite variety in climates, ſeaſons and ſoils, it was neceſſary to give a correſpondent variety to the plants and trees deſtined to produce theſe fruits; that they might be ſuitable to every ſeaſon, every latitude of the globe, and every kind of ſoil; and that mountains, ſand, and rocks might be crowned with verdure, as well as the moſt fertile vallies and plains.

2. Plants and trees being thus varied, it was neceſſary to introduce all poſſible variety in the animal creation alſo. It is generally imagined, that the variety

in plants is ſubordinate to that obſervable in animals. But this ſuppoſition is erroneous. For as the deſign of Providence was to fill the world with living creatures, and as every ſoil is not equally proper for the production of all kinds of plants, it is much more natural to imagine, that the diverſity of ſoils determines that of plants, and the diverſity of plants that of animals. And we find accordingly, that in the order of creation, as related by Moſes, the earth, and its different appearances, occupy the firſt place; then follow the plants and herbs bearing ſeed; and laſt of all, the different claſſes of animals.

The plants and trees being divided into ſo many different ſpecies, it was neceſſary, we ſay, to introduce all the variety poſſible into the animal ſyſtem. It was requiſite that there ſhould be a winged ſpecies, capable of ſpeedily tranſporting themſelves from one place to another, and frequenting the moſt diſtant or moſt elevated parts of the globe. It was requiſite that there ſhould be reptiles, which ſliding along the ſurface of the earth, might abſorb that portion of nouriſhment that would have been inacceſſible to any other ſpecies. It was neceſſary that there ſhould be quadrupeds, to conſume the ſtalks and leaves of plants, while ſome other ſpecies gathered the ſeeds, In a word, it was neceſſary that there ſhould be various claſſes of animals, and that each claſs ſhould be ſubdivided into a multitude of ſpecies of different forms and ſize; in order that every part of the globe might be inhabited, frequented, and foraged by one race of creatures or another, and that all the fruits it produces might be converted into animal life.

Let any one now examine the real ſtate of things in the world, he will find that this is preciſely the plan that Omnipotence has followed. It muſt be immediately acknowledged, that he has given an infinite diverſity to plants. Where is the country ſo abandoned by nature, as to be totally barren of productions? What ſeaſon of the year is without its fruits? Where the ſpot of ground ſo ſmall, as not to demonſtrate the extent of the plaſtic power of nature? Amidſt the thouſands of millions of blades which compoſe the moſs of the fields, how few that perfectly reſemble each other? And as to animals, their variety exceeds all conception. It is infinite with reſpect to their figure, their form, their diſpoſitions, their manner of living. From the Ciron, (hand-worms) to the elephant, there is an imperceptible gradation in the ſize of animals, and each gradation is compoſed of a multiplicity of ſpecies, all of which differ in their motions, and are furniſhed with different arms. In each gradation, there are terrine and equatic animals, and thoſe which fly or ſkim along the air. ——There is the frugivorous race, the carnivorous, and the mixt. Nor are there any whoſe ſhape and make is not particularly adapted to the place they are deſtined to inhabit, and the kind of life they are to follow.——All are endowed with ſome particular talents; and thoſe that have the ſame qualities, differ notwithſtanding in the manner of poſſeſſing them. Is ſtrength or agility the characteriſtic of an animal? In one it is ſeated in the ribs, in another in the vertibræ, in one the wings, another the hams, in one the neck, and in another the jaws. Some again are diſtinguiſhed by the exquiſite delicacy of the ſenſes; but in this animal it is centered in the ſight; in another, the hearing; in a third, the ſmell; and in a fourth, all the ſenſes ſeem to be concentered in the feeling. All have received from nature a certain number of organs, which are the ſame as to their uſe; though they are infinitely various in their form and diſpoſition. How great the difference, for example, in the arrangement of the brain and nerves of birds and quadrupeds! betwixt the ſtructure of the lungs in the terrene and aquatic race! The inteſtines of bipeds and quadrupeds are compoſed of diſtinct pieces, all of which have their particular ſhape and mould. In reptiles and inſects, it is one entire bag or canal, that commencing from the head, terminates at the tail. In the teſtaceous race, that cling to rocks and rugged parts of the earth, the bones cover the fleſh: whereas in every other ſpecies, the fleſh envelopes the bones. But that part of animals where the greateſt variety is obſervable, is the organ which ſerves to gather their food. Here every animal receives a different mould, according to the element he inhabits. Thoſe that live upon the earth and in the waters, and thoſe which frequent the air, have each of them this organ differently formed. Theſe general forms are again diverſified in every ſpecies, according to the place they frequent, and the food by which they are ſupported. It is by this that the frugivorous animals are diſtinguiſhed from the carnivorous; not only amongſt the quadrupeds, but alſo in birds and fiſh: not only amongſt animals viſible to the naked eye, but thoſe which the microſcope diſcovers. What an apparatus of ſaws, leavers, pinchers, hammers, and other offenſive weapons, are obſervable in the forehead of ſome animalcules, while that of others again is perfectly ſmooth. By this organ alſo are the ſpecies that live upon the roots of plants, diſtinguiſhed from theſe that brouze the tender herb. The quadrupeds of the firſt claſs are formed with the ſnout long and thin, the noſe hard, and turned upwards; the lower range of teeth projecting beyond the upper; the lips tightly ſtretched, and cloſe bound upon the jaw-bone. Thoſe of the ſecond claſs, on the contrary, have their lips large, and extremely voluble; the muzzle flat and wide, the teeth uniform and cloſe. So true is our aſſertion, that the variety obſervable in the animal world, is ſubordinate to that of the vegetative.

To conſider theſe varieties merely as the ſports of fancy in the Almighty, or as the caprices of a Being that amuſes himſelf with the oſtentation of his wiſdom, is to have ſtudied the nature and perfections of the great Architect of the univerſe, in certain ſyſtems of divinity only. It is to form ideas utterly unworthy of him. This infinite diverſity obſervable in animal nature, is a wiſe diſpenſation of that ſovereign goodneſs which ſaid to all the inhabitants of the earth, *increaſe and multiply:* for by theſe means it is that they are capacitated to ſpread over its whole ſurface, and convert into life all thoſe vital juices which the earth contains. As they are divided into ſo many ſpecies, and as each ſpecies is furniſhed with ſome particular armour, there is no defile too narrow for animated beings to paſs; no lodgment which they cannot take; no ſtores that do not lie at their mercy.

SECT. V.

Of the Beauty obſervable in the Structure of Animals.

WE ſhall, doubtleſs, be reminded, that notwithſtanding the variety of forms apparent, both in the animal and vegetable world, there are none irregular in their ſtructure, none deſtitute of beauty and grace. But every attentive obſerver will find, that with regard to theſe qualities themſelves, the Almighty has had the increaſe and happineſs of the animal creation more immediately in his view, than any other deſign whatever. And in fact, what is beauty but a neceſſary reſult of the aptitude of theſe forms to the offices for which they were deſigned?

From the aſſemblage of flowers, leaves, branches, ſhoots, and trunks; from the particular configuration of each of theſe parts, their proportions and regular arrangement, there undoubtedly reſults great beauty in the ſtructure of trees and plants: but from hence ariſes alſo their aptitude to vegetate, and draw from the bottom of the earth, thoſe fruits which are to be the ſupport of animals. There is no conformation better adapted to contain, in the ſmalleſt ſpace poſſible, ſuch a collection of fibres, filaments, tubes, and veſſels neceſſary to vegetative life, than the cylindric form of their trunks and branches. There is none likewiſe which ſo happily reſiſts any dangerous ſhock and every kind of friction, and conſequently equally calculated to preſerve them intire for ſo long a ſpace of time. And as to the branches which form regular diviſions, and in their different flexures ſeem to fear alike wandering too far from the trunk, and incommoding each other, they could not poſſibly take a more ſuitable direction to fill up and improve every point of ſpace which nature has aſſigned them. The leaves and flowers alſo have their particular uſes: thoſe are deſtined to favour tranſpiration, and theſe ſerve to envelope the tender fruit after it has juſt forſaken its matrix. In a word, it is impoſſible to conceive of conformations that could more effectually anſwer the deſigns of their creation.

In the animal world, the variety, regularity, and juſt proportions of their different members, confer peculiar graces upon the body to which they are united. But this is not the only, it is not the principal advantage derived from hence. To theſe it is that animals owe their ſtrength, their addreſs, and their agility. Qualities much more neceſſary to their preſervation than beauty. Yet what ſhall we ſay of the contours which nature has given them! Could ſhe form any thing more beautiful and charming? By their delicacy they diſcover a moſt agreeable mixture of lights and ſhades: by their ſoftneſs and fluidity they give riſe to a thouſand different forms, equally full of grace and expreſſion. Each muſcle that acts, each inward emotion of mind, occaſions ſome external change. The contour ſwells or dies away, contracts or elongates itſelf, according as the animal is agitated by fear or anger, joy or ſorrow. The painter, in his moſt enthuſiaſtic moments, ſometimes catches theſe viſible forms which nature has given to the ſentiments of the mind: and this is the ſummit of his ſkill in imitating that infinite wiſdom, which hath preſided over the formation of animated nature.

There cannot be, we alledge, contours ſuſceptible of more grace than thoſe which nature has appropriated to the bodies of animals. But we add, that there are none which admit of ſo great a variety of movements. Animals, according to their formation, are capable of extending and unfolding themſelves; or of folding themſelves up, and turning a thouſand different ways: and yet whatever is their attitude, they always preſerve their equilibrium. Some animals will ſlide over the moſt rugged ſurface, or paſs through the narroweſt defiles with the ſwiftneſs of a meteor. And though they are not all equally ſupple and active, it is obvious that theſe qualities are to a certain degree neceſſary for each: it is by theſe that they accommodate themſelves to the places they frequent; that they ſeek and ſeize their food with ſo much facility, and avoid with ſo much addreſs every threatning blow. Give them a form different from thoſe they have actually received, and you immediately deſtroy qualities eſſential to their well-being.

Meer ſtrength requires ſolidity only; but when it is united with ſuppleneſs and activity, what a multitude of combinations does it not demand? It requires an infinite number of ſprings, and that each ſpring be nicely poized; that it have that preciſe weight, fold, and firmneſs, as is neceſſary to produce its effects, and nothing more. It requires theſe ſprings to be extremely minute, ſo as to occupy all together, the ſmalleſt ſpace poſſible, at the ſame time that they preſerve the full liberty of action: it requires that they all be comprehended in that kind of contours, which beſt elude reſiſtance; that is in contours that are ſimple, uniform, and flowing. In a word, to unite in the ſame body ſtrength, ſuppleneſs, and agility, the moſt regular arrangement, ſymmetry, juſtneſs, and proportion are requiſite, and of conſequence beauty; which neceſſarily reſults from the re-union of all thoſe qualities *.

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* See Hogarth's Analyſis of Beauty.

The beauty of forms, therefore, obſervable in the animal ſyſtem, is ſubordinate to their utility. And they accordingly pleaſe us in proportion to their aptitude to unite theſe two objects. We contemplate the elegant make of a ſwan with pleaſure; but this pleaſure is redoubled when we behold the eaſe and dignity of its motion; or when we ſee it extend its graceful neck, and fiſh up its food from the bottom of the waters. On the other hand, the value of a figure diminiſhes in our eſtimation in proportion to its inſufficiency. The legs of a ſtag, in their preſent connection, are not deſtitute of beauty; but place them under the enormous bulk of an elephant, and they will appear much inferior to thoſe clumſy columns which ſupport this monſtrous animal. Poets have attempted to ſurpaſs nature, by uniting in one figure, the beauties ſhe has divided amongſt ſeveral. They have given wings to men and quadrupeds: they have imagined lions with the beaks of eagles, and fiſh with human heads. But they only reſemble thoſe who cut off the tail and ears of their domeſtic animals, to ornament them with bells and ribbands. They deſtroy nature, and ſubſtitute abſurdities in their place. However beautiful their Pegaſus, and Centaur, and Satyr, and Dolphin may appear in painting, they would be but hideous figures were they realized. A young man with his back adorned with plumes, and embarraſſed with a large pair of uſeleſs wings, would as certainly paſs for a monſter as an angel. How ſuperior to theſe lame and puerile figures, are the ſimple and majeſtic deſigns of nature? She has furniſhed birds with wings; but how gracefully does their light and elegant form correſpond with this attire? She has given them a long ſtrait neck, terminating in a point; but we immediately perceive that the other parts of the body required ſuch an inſtrument; and that it ſerves at once for a prow and a balance.

Even inanimate bodies themſelves derive, in great meaſure, their beauty from their aptitude to the uſes for which they are deſtined. Hence it is, that wreathed and fluted columns, which appear ſo graceful ſupporting a proportionate weight, have the contrary effect under piles of building that exceed their ſtrength. And hence it is, that the modern carriages, are with leſs ornament, more beautiful than thoſe formerly in faſhion.

But you will ſay, allowing that the juſtneſs and elegance of figure in animals contributes to adapt them to the uſes of their creation, we cannot ſee in what reſpects thoſe admirable colours nature has thrown with ſo much profuſion upon the ſurface of ſome of theſe forms, promote this end; and conſequently they poſſeſs beauties independent of aptitude. We anſwer, theſe beauties may, and actually do, in ſome other reſpects, contribute to their well-being, and this is ſuf ficient. All that we plead for at preſent is, that God never errs from this deſign in any of the qualities he has communicated to his creatures. To imagine that he adorns meerly for the ſake of ornament, is to place him upon a level with men, who often work merely to exhibit their ſkill, and whoſe productions have accordingly no particular and determined uſe. The beauties conferred upon different animals is uſeful in various reſpects, beſides that already ſpecified. It is this which attaches them ſo cloſely to their own being; it is this which renders them ſo attentive to cleanſe, ornament, and take care of themſelves: for with their beauty they have received the conſciouſneſs of it, and a deſire to preſerve it. What complacency appears in the glances they caſt upon themſelves! What expreſſions of ſelf-admiration in their tone, and in their gait! They are continually occupied to preſerve, in all its luſtre, the enamel which nature has given them:

and theſe offices contribute not a little to their health. They not only perceive the value of their own beauty, but they behold and admire it in others. This is undoubtedly the caſe with regard to both ſexes of the ſame ſpecies: never are they ſo attentive to diſplay the graces nature has beſtowed; never are they ſo oſtentatious, as when they are together: and, if we may judge of them from our own feelings, how greatly muſt this diſpoſition contribute to their felicity?

PART THE SECOND.

SECTION I.

Of the perpetual Oppoſition that ſubſiſts betwixt Animals of a different Race.

THERE is another phenomenon in the animal ſyſtem, which merits all our attention; and which we ſhall conſider in the ſame point of view as the preceding.—One part of life is perpetually at war with the other; one half of this living ſubſtance feeds upon another. A phenomenon this which has greatly embarraſſed multitudes. How many things have been alledged to reconcile it with the ideas of a beneficent Providence, that watches over the happineſs and preſervation of all his creatures?

Some have ſuppoſed that it was a neceſſary conſequence of that univerſal corcorruption, in which they imagine all nature to have been involved, ſince the fall of Adam; and to furniſh ſome exceptions, at leaſt, to ſuch bad examples, they have rigorouſly obtained from the uſe of abstained Fleſh.———Others have thought that there muſt be a future ſtate, a paradiſe provided for the wretched martyrs amongſt the brutal race, as well as for thoſe who merit this title amongſt the human.——Not to obſerve that theſe hypotheſes are void of foundation in the actual conſtitution of things; they do not remove the difficulties, but only ſubſtitute one in the place of another. The truth is, when we would form juſt ideas of the plan of Providence, we are not to reaſon after our own imagination, or regulate our judgments according to the deciſions of a pretended infallibility, which ſome arrogate to themſelves. We ſhould adhere to facts; collect as many of theſe as poſſible; contemplate them on all ſides; compare them together, and make their mutual relation or diſagreement the foundation of our reaſonings.

It is very evident that Providence not only permits, but has deſigned, that animals ſhould devour each other. If any one doubt of this, let him conſult the common impulſes of his nature. From whence proceed thoſe involuntary horrors at the approach of ſome animals, and that mechanical deſire, as it were, of falling upon them?——Perſons of delicacy, and poliſhed manners, will aſſert, perhaps, that they are ſtrangers to theſe emotions, and that they do not find in others examples enough to conſtitute a general rule. But if ſuch propenſities are unknown to them, it is becauſe they have been ſubdued by thoſe gentle manners, that mildneſs of diſpoſition, which they have acquired in civil life: yet they ſtill lie concealed in their nature, and there are ſeaſons when they will break forth in ſpite of all theſe barriers. "Civil ſociety" (ſays an excellent modern critic) "firſt of "all tames us to humanity; and, in the "courſe of its diſcipline, brings us all to "a dead level: its effect is to make us "all the ſame pliant and obſequious thing. "But when the violent paſſions ariſe (as "in the caſe of thoſe apes, when the ap-"ples were thrown before them) this ar-"tificial diſcipline is thrown of; and we "return to the free and ferocious ſtate "of nature *(b)*."

But we will not inſiſt too much upon theſe propenſities: there are others ſtill more deeply impreſſed.——From whence ariſes that deſire apparent in moſt men to feed upon fleſh? Or if you ſuſpect hu-

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(*b*) Hurd's Notes on the Art of Poetry.

man nature to be depraved in this reſpect, examine the other ſpecies. See how ſome animals thirſt after the blood of others; how nature has armed them with claws and teeth to put their bloody purpoſe in execution; while ſhe has only endowed the victims of their fury with vigilance and activity; and to others ſhe has left no other means of defence than cries and groans. Conſider the voraciouſneſs of the eagle, the ſurprizing ſtrength of its bill, and its piercing eye, that darts ſwift as lightning upon the moſt diſtant objects: contemplate the ſpider's web, with what truth is it conſtructed, and with what addreſs do they employ it to entangle their prey. It is evident, I ſay, that animals are in a ſtate of perpetual war, and that it is the will of their Creator that one ſhould live upon another.——And what is the conſequence? That the works of the Omnipotent are defective? Or that the world, which was created perfect, has ſince fallen into a general depravity? Theſe by no means follow. Proofs of the depravity of nature may be ſought after elſewhere. It is no leſs certain, that the law which enjoins the deſtruction of one animal for the advantage of another, contributes to the increaſe and happineſs of life. This we ſhall now attempt to prove.

SECT. II.

The Deveſtation which takes place in Animal Life, contributes to its Re-production and Well-being.

IT will doubtleſs be acknowledged, that the law which appoints one animal to become the food of another, contributes to the augmentation and happineſs of life, if we can prove the two following propoſitions: 1. That it introduces ſeveral new ſpecies, which could not otherwiſe exiſt. 2. That the acceſſion of theſe new ſpecies is not, in any reſpect, prejudicial to the other; but on the other hand, uſeful, ſul, and in ſome reſpects, neceſſary to them.

SECT. III.

The firſt Propoſition proved.

THE firſt propoſition is of the nature of thoſe that require little more than to be mentioned, in order to convince us of their truth. How great a variety of new ſpecies of animals does this law introduce into the ſyſtem of nature? It introduces

(1.) Thoſe reptiles and inſects which ſwarm about dead bodies, and feed upon their ſubſtance.——To judge from appearances, we ſhould imagine that theſe animals were produced by putrefaction itſelf. And this indeed was the opinion of the ancients. But modern naturaliſts have found, by a more accurate examination, that they owe their exiſtence to the eggs de-

depoſited by ſome other inſect. They have put freſh meat into different veſſels, ſome of which they have left open, and others covered with a fine cloth. The fleſh thus incloſed has putrefied, and been converted into a thick and offenſive fluid, without producing any animals, although it had communication with the external air. Thoſe, on the contrary, which were quite expoſed to the atmoſphere, have been filled with worms in a very ſhort ſpace, and theſe worms have been transformed into moths, exactly ſimilar to thoſe which were at firſt obſerved to ſurround theſe ſubſtances *(c)*.

But further, this opinion of the ancients was principally founded upon certain transformations which they imagined took place in ſome animals: but it has been demonſtrated that theſe transformations are abſolutely chimerical; that the animal, which appears firſt as a caterpillar, afterwards a nymph, and laſtly a butterfly, incloſed even in the form of caterpillar, the feet, wings, antheræ, and, in a word, all the members peculiar to a butterfly; and that the different changes it undergoes, conſiſt merely in the developement of theſe members, which were moſt curiouſly folded up, and tightly ſwathed round as it were with different coverings, juſt as the bud of a flower always incloſes the ſame fruit, though under different appearances *(d)*.

(c) Franciſcus Rhedi de Generatione Inſectorum.

But it is ſufficient for our purpoſe that this race lives upon animal food; as we are intitled to give it a place amongſt thoſe which are introduced into the animal ſyſtem, by the law we are attempting to vindicate.

(2.) To theſe ſpecies we muſt add thoſe that attach themſelves to the bodies

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(*d*) Swammerdams's Hiſtory of Inſects.

of living animals, and draw their nouriſhment from thence. The numbers that are of this ſpecies, are ſcarcely to be conceived. There is no quadruped, no bird, no animal whatever, obvious to the naked eye, where other animals may not be found feeding upon their ſubſtance, endowed with different forms, and furniſhed with different arms according to the nature of the bodies upon which they feed *(g)*. There is, in freſh water, an inſect, which appears but a point as it were; yet when it is examined by the microſcope, you may diſcover that it is continually employed in defending itſelf againſt other inſects of a much ſmaller ſize; and what is the more extraordinary, nature has, for this purpoſe, armed it with a kind of ſcourge, with which it is inceſſantly beating its ſides.——It is true, theſe animals, as well as thoſe we have mentioned above, appear to us mean and contemptible;

(g) Franciſc. Rhedi de Ged. Inſect. pag. 320.

but whatever they may be in our eſtimation, they are ſtill the production of omnipotence; and they poſſeſs, in common with other animals, which may ſeem more important, fibres, tendons, muſcles, veins, arteries, circulating fluids, that wonderful arrangement of ſprings, that action and re-action of an infinite number of cauſes, or, in a word, that inexplicable ſomething which conſtitutes the eſſence of animal life, and which no man can comprehend.——The ſentiments of abhorrence that we find within ourſelves, with regard to ſome animals, are intirely relative to their ſituation reſpecting us; but it is not in this point of view that we are to contemplate them, when we would form a juſt eſtimate of the excellence of their being *(h)*.

3. We

(h) If we judge of this inſect according to the accounts given us by ſome naturaliſts, who have examined them with care, and free from prejudice, we ſhall have very different ideas of them. "Though

3. We obſerve a multitude of birds, continually employed in digging up, and deſtroying the reptiles and inſects which live upon the ſurface of the earth, and upon

"Though every thing," ſays Mr. Baker, ſpeaking of aquatic inſects, "is alike eaſy to an infinite and almighty Being; yet, according to human comprehenſion, it appears extreamly wonderful, that we find, almoſt without exception, in theſe ſpecks of life, whoſe minuteneſs renders them almoſt imperceptible to the eye of man, a greater number of members to be put in motion, more wheels and pullies to be kept going, a greater variety of machinery, an apparatus more complex and curious, a plan ſeemingly of deeper contrivance; in ſhort, more elegance and *workmanſhip* (if the term may be excuſed) in the compoſition, more beauty and ornament in the finiſhing, than are ſeen in the enormous bulk of the elephant, the crocodile, and the whale, compared with which one would think them no leſs the effect of a more exquiſite and ſuperior art, than the movements of a watch appear to be on compariſon with the wheels of a coach or waggon." Baker's Employment for the Microſcope, Introduct. to Part 2.

trees and plants. This is another order in thoſe new ſpecies of animals, that are introduced into the world by that plan of Providence of which we are treating. And it muſt be acknowledged that theſe birds are wonderfully adapted to the places they occupy, both with reſpect to their form, ſize, and the acuteneſs of their ſenſes. Their bill is thin and long, their claws obtuſe, their wings ſhort, their flight precipitate; their ſize is ſmaller than that of the winged ſpecies in general, by which means they readily paſs into places, where they expect to find their prey, and carry it off in ſpite of every retrenchment.——It is obſervable, that they are continually employed in ſcratching up the earth; by this artifice they draw the worms towards the ſurface, and readily catch them.

4. Amongſt theſe are the winged race alſo, which hover over the waters, and feed upon fiſh: and perhaps there is no

race more numerous. From one extremity of the globe to the other, the marſhes, lakes, rivers, creeks, bays, gulfs, and ſea-coaſts are peopled by theſe animals, and reſound with their cries. They abound upon every coaſt of the habitable parts of the earth; and the doubtful pilot, whenever he ſees them, is no longer uncertain what courſe to ſteer, as they all of them differ, in ſome reſpects, according to the parts they frequent. It is impoſſible to read the accounts of travellers without admiring the wiſdom of Providence, which has provided inhabitants for the moſt detached, and moſt deſolate quarters of the globe.

5. Of this number are the carnivorous race likewiſe, that are confined to the land, ſuch as lions, tygers, wolves, bears, amongſt the quadrupeds; eagles, vultures, cormorants, hawks, amongſt the birds. ——It muſt be acknowledged that, next to man, this ſpecies of animals is the moſt perfect of any. Their lofty and active

gait, their bold and piercing looks, their courage, their ſtrength, their roarings, their rage, all demonſtrate that they have received a double portion of the living principle. And yet were it not for this inſtitution of Providence, that one part of the animal ſubſtance ſhould live upon the other, they muſt neceſſarily have been excluded from the creation.

6. We proceed further, and aſſert, that man himſelf is to be ranked amongſt the ſpecies which exiſt in the animal ſyſtem in conſequence of this inſtitution. Does he not live chiefly upon fleſh? And ſuppoſe there are ſome that are ſupported by vegetables only, yet is their number equal to the others? And is the vigor, ſtrength, and courage of this claſs to be placed in competition with the vigor, ſtrength, and courage of thoſe that live upon animal food? Without ſuch an inſtitution of Providence, three-fourths of the human ſpecies would be deſtitute of

ſuſtenance; for all the human race could not poſſibly live upon the fruits of the earth. The greateſt part of her productions are not fit for uſe before they have been digeſted, and converted into the ſubſtance of the animals which feed upon them. And with reſpect to thoſe who live immediately upon vegetable food, there are few countries that produce it in quantities ſufficient to render it the only ſupport of their inhabitants. But let us ſuppoſe the earth to enjoy all the fertility requiſite for this purpoſe, it could not enjoy it, eſpecially in ſome parts, but in conſequence of cultivation *(g)*. But this cultivation requires leiſure, ſkill, improvements (*h*): it requires ſome acquaintance with the ope-

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(*g*) In America, the earth ſpontaneouſly produces a great abundance of fruits. I ſuſpect that Europe would not enjoy this advantage, was the earth to remain uncultivated: we ſhould ſee little more than foreſts, oaks, and other barren trees. Eſprit des Loix, liv. 16. ch. 9.

(*h*) Eſprit des Loix, liv. 18. ch. 15.

rations neceſſary for the production of plants: it requires the plow, the ſpade, the mattock; that is, a knowledge of metals, and how to work them (*i*): it ſuppoſes alſo ſome eſtabliſhed community, certain forms

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(*i*) Mr. Locke conſiders the diſcovery of iron as the foundation of the arts and ſciences. Of what conſequence, ſays he, the diſcovery of one natural body, and its properties may be to human life, the whole great continent of America is a convincing inſtance; whoſe ignorance in uſeful arts, and want of the greateſt parts of the conveniences of life in a country that abounded with all ſorts of natural plenty, I think, may be attributed to their ignorance of what was to be found in a very ordinary, deſpicable ſtone; I mean, the mineral *iron*. And whatever we think of our parts, or improvements in this part of the world, where knowledge and plenty ſeem to vie with each other; yet to any one that will ſeriouſly reflect on it, I ſuppoſe it will appear paſt doubt, that were the uſe of iron loſt amongſt us, we ſhould, in a few ages, be unavoidably reduced to the want and ignorance of the ancient ſavage Americans, whoſe natural endowments and proviſions forms of government, and a favourable ſituation with reſpect to the neighbouring nations. It requires that thoſe who cultivate the earth, ſhould be perſuaded of protection againſt the injuſtice of individuals, and the rapine of a foreign enemy. Where any one of theſe circumſtances is wanting, it will be extremely difficult, not to ſay impracticable, to eſtabliſh agriculture, particularly in the colder climates, where the earth is fruitful for ſome few months in the year only, and

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ſions come no way ſhort of thoſe of the moſt flouriſhing and polite nations. Lib. 4. c. 12. §. 11. Locke's Eſſay concern. Underſt.

When the ſavages of Canada ſtand in need of a hatchet, they take a flint; and after having employed much time and pains to ſharpen it, and reduce it to a convenient form, they inſert it in a young tree, in which they have previouſly made an apperture. Afterwards, when it is grown, and the flint incorporated with it, ſo as to become immoveably fixed, they cut down the tree; and this inſtrument ſerves inſtead of a hatchet. Charlevoix, tom. 6. p. 50.

where men are obliged, in conſequence, to lay up ſtore of proviſions for the winter ſeaſon. And can it be ſaid that theſe circumſtances equally unite in favour of all mankind! What numbers that are ignorant of the very name of this art? What numbers, who being continually ſurrounded by ſavage and vagrant nations, have no other ſecurity than the deſolation of the country they inhabit *(k)*. What numbers, whom indolence, ſavage manners, inſeparable from their condition, and above all their extream indigence, prevent from applying themſelves to this art. A people, that are obliged to paſs continually from mountain to mountain, from foreſt to foreſt, in ſearch of the neceſſaries of life, and find nothing more than meer neceſſaries, little think of dwelling upon a particular ſpot, of cultivating it, and

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(*k*) Thoſe countries which are the moſt fertile are the moſt frequently depopulated, whilſt the deſolate countries of the north are always inhabited, becauſe they are almoſt uninhabitable. Eſprit des Loix, liv. 10. chap. 3d.

waiting patiently till the time of harveſt. Such was formerly the ſtate of Europe. The human race had peopled all the different parts of it long before agriculture was known (*l*). Such is the preſent ſtate of large numbers of people in America. And they will doubtleſs continue in the ſame ſituation, till ſeveral of them, being united by foreign conqueſts into one empire, ſhall eſtabliſh ſome form of government that will be more regular at home, and more reſpectable abroad. It was meerly by virtue of the conqueſts which were firſt made by the Egyptians and Phenicians, then the Greeks and Romans, and afterwards the Franks, under the empire of Charlemagne, that the arts and ſciences found their way to the very centre of Europe. In a word, the invention of agriculture is the effect of chance; and its eſtabliſhment muſt proceed from the union of a great variety of circumſtances

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(*l*) See Pellontier Hiſtoire des Celtes, tom. 1.

that are not in the power of every nation. What proof therefore can be more concluſive, that men are deſtined to feed upon the fleſh of animals, and not meerly upon the produce of the earth? And accordingly is this intention of Providence deeply imprinted upon the manners, appetites, and cuſtoms of the greateſt part of the human ſpecies. Moſt nations are fond of hunting, and purſue it; moſt regard the fleſh of animals as their favourite food.

It has been remarked that the teeth in men are formed differently from thoſe of the carnivorous race; and therefore they cannot, according to the intention of nature, belong to this claſs of animals. But it is certain that they have four eye teeth, as they are termed, which is not the caſe with the animals that live entirely upon fruits. Suppoſe, however, the human ſpecies to be deſtitute of this kind of inſtrument, which is appropriated to ſeize, and tear the food in pieces, rather than to chew it, men do not, it is very apparent, ſtand in abſolute need of ſuch an invention, ſince nature has furniſhed them with more powerful methods of producing this effect. It has been further alledged, that men cannot make uſe of fleſh till it has been prepared by fire; and they have added (very judiciouſly without doubt) that even in this ſtate, the ſick are always denied the uſe of it. Not to obſerve that theſe aſſertions are not abſolutely true, ſince there have been, and ſtill remain, whole nations that ſubſiſt upon raw fleſh: they are of equal force againſt the uſe of vegetables, which ſcarcely agree better with our ſtomachs, except they have been ſtewed or boiled. Again, the ſame concluſion has been drawn from the ſtructure of the human inteſtines (*m*): it is true that they are both longer, and more relaxed than thoſe of carnivorous

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(*m*) Monro's Comparative Anatomy.

quadrupeds. But this difference ſeems to ariſe from hence; in men the teeth are principally grinders, while thoſe of other animals are chiefly inciſive: in the former, the food enters the ſtomach properly manducated, and prepared for digeſtion; whereas the latter ſwallow it in ſuch large pieces that it is totally unfit to paſs into the inteſtines; and we accordingly find, that in dogs, which are the moſt greedy animals, and frequently ſwallow bones themſelves, the villous coat of the ſtomach has its folds running in a longitudinal direction, inſtead of the tranſverſe. We find alſo this coat remarkably ſtrong in ſerpents, that ſwallow animals intire. This viſcous being cloſely impriſoned by the ſurrounding ribs and vertebræ, ſeems to be aſſiſted in its functions by their immediate preſſure. In a word, pullets, and all the winged ſpecies that feed upon grain, and ſwallow it whole, have the ſtomach compoſed of an infinite number of muſcular fibres interwoven, and the internal ſurface is lined with a kind of callous ſubſtance, to which are affixed ſmall pebbles, or little pieces of glaſs. While the inteſtines of thoſe quadrupeds, which likewiſe feed upon grain, but grind it with their teeth, are not of ſimilar conſtruction; though ſome of them are not larger than this ſpecies of fowl. Theſe obſervations ſeem to indicate that the ſtructure of the inteſtines depends, in ſome meaſure, upon that of the jaw; and that, conſequently, thoſe membranes, which line the inteſtines of carnivorous animals, are formed with ſuch thickneſs and ſtrength as they are to receive the food but groſly ſeparated, and imperfectly manducated: whether this formation be required more effectually to reſiſt the influx of bile, ſo neceſſary to diſſolve this groſſer food, or to compleat the digeſtion which the teeth had but rudely began. We ſay, therefore, in two words, that the teeth in men are not formed ſimilar to thoſe of other carnivorous animals, becauſe ſuch a form was not neceſſary; and that their inteſtines are not of equal ſtrength with thoſe of the latter, becauſe the conſtruction of their teeth render ſuch a force ſuperfluous. Nature does nothing in vain.

SECT. IV.

The ſecond Propoſition proved.

WE have been enumerating the different ſpecies introduced into the animal ſyſtem, by that law of nature which enjoins the deſtruction of one animal for the good of another. We are now to prove that the acceſſion of this new ſpecies, ſo far from being injurious, is both advantageous, and eſſentially neceſſary to them. This ſecond propoſition muſt be conſidered, according as it relates to the two different claſſes of animals which live upon fleſh; for ſome are carnivorous without deſtroying their prey; others both deſtroy and devour.

Our propoſition is already proved with reſpect to the firſt claſs of carnivorous animals.——It is evident that an increaſe of life reſults from their exiſtence, which is no ways injurious to the other ſpecies. A curſory examination of their origin, progreſs, and employment, will immediately demonſtrate, that they are created to gather the ſpoils of life in ſome, and to preſerve others in health and vigor. An animal no ſooner expires, than we behold them aſſembled in ſwarms around the carcaſe. Some ſeem to have ſprung from the ſubſtance itſelf; others are allured by the vapours exhaling from it; and which are ſcattered by the wind: the body quickly becomes a re-animated maſs; the different parts of which are afterwards diſperſed, and reſign in their turn the gift of life to other ſpecies, or preſerve it according to their particular order and claſs (*n*).

(*n*) I incloſed, ſays Rhedi, ſome fiſh, called Barbes, in a box, perforated with ſeveral holes, Such is the wonderful œconomy of nature! Thus it is that by multiplying the ſpecies

and upon opening the box about four hours afterwards, I found an innumerable multitude of very ſmall worms upon the fiſh, and lodged in the interior crevices of the wood; and about the worms there were heaps of little eggs, ſome of a white, others of a yellow colour; theſe, when broke, emitted a whitiſh liquor, thinner than the white of a bird's-egg, but not ſo viſcid. I replaced the box in its former ſituation; and upon opening it a ſecond time, I ſaw that all theſe eggs had produced worms, and that the empty ſhells remained in the place where they had been depoſited. I found alſo that the worms, which made their appearance the day before, were as big again as they were the moment they burſt their ſhell: and what is ſtill more ſurprizing, they were grown the day after to ſuch a ſize that each of them weighed about ſeven grains, though twenty or thirty of them before did not exceed a grain. Others, which ſprung from theſe eggs, though they were extreamly minute, conſumed the fiſh in a moment, leaving the bones only, which appeared like ſo many ſkeletons juſt brought out of the cabinet of the moſt curious anaſpecies, the living ſubſtance ſuffers no diminution! Its very deſtruction ſerves to re-produce it! Thus does the flame of life, after it is extinguiſhed in one claſs of animals, immediately re-kindle itſelf in another, and burn with freſh luſtre and ſtrength!

But this is not the only advantage that reſults from their exiſtence. By conſum-

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anatomiſt in Europe, ſo nicely were they diſſected. I then carefully ſhut up the box, ſo that the worms, notwithſtanding all their efforts, could not poſſibly eſcape; and I found, that in the ſpace of five or ſix days after they were firſt hatched, they were transformed into as many eggs; and that ſome time after, there ſprung from theſe eggs flies of a green, and gnats of an azure or black colour. Twenty days afterwards, having obſerved that ſome eggs of a blackiſh hue had as yet produced nothing, I put them in a veſſel by themſelves; and, in the ſpace of two days, there was a large quantity of gnats which greatly ſurpaſſed the eggs in number. This induced me to open ſome of them; and I found that each contained no leſs than 25 or 30, and ſome to the number of 46. Rhedi de Gen. Inſt.

ing theſe carcaſes, and that in ſo ſhort a time, they prevent them from infecting the air with their exhalations; and thus contribute to the life and health of all the other animals. There is not, perhaps, a ſpot upon the globe where this effect is more apparent than in the neighbourhood of Carthage in South America. The climate here is extremely warm; the air is rendered humid by violent rains; the country is fertile, and covered with immenſe foreſts: all theſe circumſtances conſpire to favour putrefaction, which would, in a ſhort time, render the air extremely unwholſome, was it not for a prodigious quantity of gallinazos, which nature ſeems to have expreſsly commiſſioned to conſume the carrion, and every kind of ordure. This bird is furniſhed with a large bag, or craw, under its bill, compoſed of a thick, fleſhy, ſupple membrane, which diſtends like leather. It is inconceivable the quantity of filth this will contain. So exquiſite is the organ of ſmell, that this bird will ſcent its prey at the diſtance of three or four leagues; and ſuch is its voracity, that it will never leave till it has intirely conſumed it (*o*). In Egypt, when the waters retire from the Nile, and the lands are covered with frogs, and numberleſs inſects, myriads of pelicans, cranes, and other birds of prey, arrive from the red ſea, and the coaſts of Greece; which ſoon relieve the country of this ſuper-abundance of life; and thus render themſelves of the utmoſt utility to the inhabitants (*p*). But without going ſo far for examples, this ſpecies of animals are ſeen in every country; and particularly near large cities. To them it is that we are in part indebted for the purity of the air we breathe: conſiderations which ought doubtleſs to ſecure them from every inſult; and yet, in ſome countries, the inhabitants not only deſtroy

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(*o*) Don Ulloa's Voyage to Peru, liv. 1. chap. 7.

(*p*) Haſſelquiſt's Voyage up the Levant.

them, but think that they are removing a nuiſance.

The Hottentots, Caffres, Negroes, and the people in general which inhabit the coaſts of Africa, are very fond of dead bodies, and devour even their excrements (*q*). The Tartars eat horſes, dromedaries, and all their domeſtic animals in general which die of themſelves; and what is more remarkable, they keep a ſet of dogs, on purpoſe to be devoured by them in return, after their deceaſe, regarding this as the moſt honourable burial. Their grand Seigniors keep theſe animals in their houſes, and they conſtitute a part of their retinue. The common people, who cannot otherways ſupport them, keep a pack in common, to perform this kind office for them one day or other. When they let theſe animals looſe

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(*q*) Dapper Deſcription de l'Afrique. Recit Hiſtorial du Royaume de Guinée à Amſterd. 1595.

upon the deceaſed, the attendants judge favourably or disfavourably of the ſoul, according to the number that ſurround the body. Half a dozen at leaſt are neceſſary to form a happy omen of his ſtate (*r*). As remote as theſe cuſtoms may appear from the order of nature, perhaps they deviate leſs than thoſe of which we have been ſpeaking.

Thus have we conſidered our ſecond general propoſition with reſpect to the ſpecies which are carnivorous without killing their prey.

(*r*) In Hyrcania plebs publicos alit canes, optimates domeſticos; nobile autem illud canum genus ſcimus eſſe, ſed pro ſua quiſque facultate parat a quibus lanietur, eamque optimam illi cenſetur eſſe ſepulturam. Cic. Tuſcul. Quæſ. liv. 1. chap. 45. See alſo Hanway's Travels, c. 6.

SECT. V.

Of the Law which enjoins the Multiplication of Animals, and of its Effects.

TO all the inhabitants of the earth this command of Providence, "increaſe "and multiply," was iſſued forth; and as it is upon the obſervance of this law that the preſervation of the different ſpecies depend, all are rendered capable of obſerving it; and they are univerſally incited to this by the moſt powerful of motives. The allurements of pleaſure, the deſire of peace and tranquillity, the deſire of abundance, the deſire of ſatisfying the demands of hunger and repoſe, the deſire of life itſelf, all yield to this (*s*). So that it is natural for every ſpecies to procreate, though procreation is more or leſs abundant, according to the rank they occupy in the animal

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(*s*) Virg. Georg. lib. 3. v. 257.

ſyſtem. It has been remarked that horned cattle, buffaloes, and in general all the animals which graze, thrive better in America than the carnivorous race (*t*). This appears to be univerſally the caſe: and I believe that thoſe who talk of certain countries where droves of wolves are as common as flocks of ſheep with us, amuſe us with fables (*u*). For it is evident, that the carnivorous race muſt neceſſarily exiſt in a much leſs abundance than the animals upon which they feed.

It has been aſſerted farther, that the ſpecies were leſs carnivorous in America, and, at the ſame time, more fruitful, than in other parts of the globe (*x*). Without examining into the reaſons upon which this aſſertion is founded, we ſhall content ourſelves with obſerving, that it is con-

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(*t*) Eſprit de Loix, lib. 18. c. 9.

(*u*) It has been ſaid of Kamſchatka. See the Hiſtory of Kamſcatka tranſlated into Engliſh.

(*x*) Brooke's Natural Hiſtory.

trary to the law of nature, according to which the voraciouſneſs of one part of the animal ſyſtem, always bears an exact proportion to the fecundity of the other: that it is alſo contrary to what is reported of certain ſpecies of animals, which inhabit that part of the world, ſuch as tigers and galinazos in the neighbourhood of Carthagena, crocodiles in the river of Guyaquil, eagles in the deſert of Andes, and wild cats in Louiſiana. But be this as it may, we find amongſt us animals which are prolific to an incredible degree; ſo that neither the depradations of men, or beaſts of prey, are able to extinguiſh their race. They ſubſiſt in oppoſition to theſe united efforts; and upon the ſmalleſt intermiſſion of ſlaughter, they preſently recruit their numbers. Of this kind, for example, are goats and deer, rabbits, hares, &c. It is difficult to conceive to what a degree nature has endowed theſe animals with the power of propagation. The females amongſt hares and rabbits ſcarce quit the dug but they admit the male, and contribute to the augmentation of their ſpecies; at the expiration of 31 days they bring forth their young, and produce four or five at a litter. Thoſe who have diſſected theſe animals inform us, that they have a double matrix, each horn or bag conſtituting one; and by this conſtruction of the parts of generation, they are capable of receiving the male, notwithſtanding ſeveral previous conceptions; ſo that they have frequently a ſuper-fetation, or double brood *(y)*. Thus it is that theſe animals readily repair their loſs, and that the few which remain in one ſeaſon, are ſufficient to repleniſh their number by the ſeaſon enſuing.

And yet their fecundity, remarkable as it may appear, does not point out the limits which nature has preſcribed in this reſpect. Some ſpecies carry this faculty ſtill further. Rats, mice, field-mice

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(*y*) Buffon's Natural Hiſtory.

are much more prolific, and ſudden in their appearance. It is but a few years ſince a neighbouring nation was in danger of being bored through, and utterly deſtroyed in the ſpace of three months by one of theſe ſpecies. And what ſhall we ſay of certain inſects, which require but a few days to multiply their race, in ſuch a manner as to overſpread and deſtroy extenſive plains, nay, whole countries themſelves. What ſhall we ſay of certain fiſh, the cod-fiſh for example, of which *one alone* is ſufficient to ſtock, in a few years, not only the whole extent of ocean, but the univerſe itſelf (z). In every ſpecies, but particularly thoſe we have juſt mentioned, life may be conſidered as an impetuous torrent, which is inceſſantly bearing down, and beating againſt the banks that oppoſe its courſe; and whenever it breaks through this barrier, it ſpreads into a tremendous ocean. Hanway relates, that when the graſhoppers paſs from Perſia into the kingdom of Aſtracan, the air is darkened by their numbers, and the ver-

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(z) The number of ſpawn laid by ſome fiſh is almoſt incredible; the roe of the cod-fiſh, for example, in the ſpace of a cube of one-fourth of an inch, contains 250 eggs; and according to that proportion, the whole muſt contain about 1,000,000. The great Mr. Lewenhoek tells us, that in the ſpace of a ſmall ſand of the male-ſeed of the cod-fiſh there are above ten thouſand animalcula. Now ſuppoſing that every egg or ſpawn of a ſingle cod-fiſh ſhould come to perfection, and that in

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in five years time every one of thoſe fiſh ſhould be capable of producing others, ſuppoſing only half of them females, the increaſe of them would then be 5,000,000,000; and five years afterward, by the ſame reckoning, there would be an increaſe of about a thouſand miriads of miriads: which increaſe, in the ſpace of ten years, from one ſingle fiſh, would give us room to ſuppoſe that in a thouſand years, at that rate, the cod only, ſo propagated, would fill up more ſpace than the whole world contains. Nor are the fiſh of the rivers and lakes leſs prolific, conſidering their proportion. A carp does not ſpawn leſs than 20,000, and perhaps a tench half as many. *Bradley's Philoſoph. Account of the Works of Nature.*

verdure of the fields, wherever they repoſe, is in leſs than an hour totally deſtroyed. This author adds, that, overcome with fatigue, they ſometimes fall into the rivers, or the ſea, where they aſſemble themſelves into diſtinct companies, and ſwim upon the ſurface of the water, in ſuch multitudes, that it is with difficulty veſſels are able to force a paſſage through them (*a*). Shaw relates alſo that they ſally forth in large bodies, ſo as to ſtop up, by their numbers, the dikes filled with water, and to extinguiſh the hedges ſet on fire to oppoſe their courſe: that they paſs like a ſucceſſion of clouds, and that the laſt company will devour the very bark from the trees (*b*).

If there are ſome ſpecies whoſe progreſs is leſs rapid, it is becauſe their larger, and more complicated make, requires greater length of time to bring them to perfection. The deſire of propagation is other-

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(*a*) Hanway's Trav. chap. 19. p. 85.

(*b*) Shaw's Travels into Barbary.

ways common to them all (*c*). Nature has crowned theſe deſires in all with ſuch a liberal hand, that there is no ſpecies left to itſelf, and ſecure from every injury, but what would propagate, till at length it over-run the other ſpecies, with which it ought to obſerve a conſtant æquilibrium. Should any perſon demand examples of the prodigious effects of multiplication, even in thoſe ſpecies which appear the leaſt prolific, let them conſider the progreſs which ſome of our domeſtic animals have made in America. About half a dozen horſes, and as many cows, exported by the Spaniards to Buenos-Aires, have long ſince peopled and over-run an immenſe extent of country that lies betwixt *La Plata*, and the ſtreights of Magellan. They are ſo numerous that they are deſtroyed by thouſands meerly for their ſkin and

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(*c*) Omne adeo genus in terris hominumque ferarumque,
Et genus æquoreum, pecudes, pictæque volucres
In furias, ignemque ruunt. Amor omnibus idem.
Virg. Georg. lib. 3. v. 242.

fat (*d*). The ſame number of grey-hounds, ſent by a vice-roy of Peru into Fernandis iſland, has made a ſimilar progreſs (*e*). A multitude of horſes, and wild dogs, are alſo found in the iſland of St. Domingo, which owe their origin to ſome few individuals of this ſpecies which the Spaniards brought with them (*f*).

Let us now inquire into the conſequences which neceſſarily reſult from this multiplication of every ſpecies, and they will give us juſt and clear ideas of our ſecond propoſition, viz. that the introduction of the carnivorous race into the animal ſyſtem, ſo far from being injurious to the other ſpecies, is, on the contrary extremely uſeful and ſalutary.

(*d*) Anſon's Voyage.

(*e*) Don Ulloa's Voyage, tom. 2.

(*f*) Labbat. tom. 7. pag. 197.

SECT. VI.

Of the Conſequences which neceſſarily reſult from the Law of Multiplication.

WHAT is the conſequence of this aſtoniſhing increaſe, common to every ſpecies, when they are protected from injuries, and able to ſupply their own wants? It is that all, without exception, require ſome coercive force to ſuppreſs their progreſs, and to prevent their exceeding a due proportion relative to the other ſpecies. For it is apparent, that without this, the law of multiplication, ſo neceſſary for their preſervation, would threaten their immediate deſtruction. For whenever one ſpecies is predominant, it muſt neceſſarily deprive the others of their nutriture. It would alſo infect the air with noxious exhalations; eſpecially when ſuch innumerable multitudes come to be mowed down by death: and from all theſe cauſes united, a univerſal languor and debility of the animal ſyſtem, muſt unavoidably take place. The reader needs not to be reminded of the plagues with which God viſited Egypt, particularly the frogs and inſects; or of the mortality which followed. Or was he to recollect what we have juſt related concerning the graſhoppers in Barbary, he would eaſily conceive the miſeries of a country, where the trees themſelves are devoured to the quick, where the earth, ſpoiled of its treaſures, preſents to the view nothing but the footſteps of mournful deſolation. Of all the ſcourges with which God afflicts his creatures, none perhaps are more terrible than this.——There is in Augenmois in France, a ſmall inſect that attaches itſelf to the corn, both in granaries, and in the fields; and which has increaſed to ſuch a degree, as to conſume the greateſt part of it, ſo that the common people were deſtitute of bread (*g*). May-bugs, ſome

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(*g*) Journal des Savants, Decr. 1742.

years ago, laid waſte ſeveral diſtricts in England. And a ſea-worm increaſed beyond its due proportion, has, more than once, brought Holland to the very brink of deſtruction.

As there is no country exempt from theſe inundations of life, ſo is there no ſpecies incapable of it; and which-ever they be, they become a ſcourge, not only to the other ſpecies, by theſe means confined within too narrow limits, and robbed of its food, but alſo to themſelves. For it is with the animal as with the vegetable ſyſtem: the different ſpecies can only ſubſiſt in proportion to the extent of land they occupy; and whenever the number of individuals exceeds this proportion, they muſt decline and periſh. A ſuperabundance of life muſt always occaſion a ſcarcity of proviſion. Such numbers of bodies alſo continually moving about in the ſame column of air, muſt ſoon abſorb all its vital ſalts; and the air thus exhauſted and heated, will, at length, become of a pernicious quality. The human race itſelf experiences the truth of this aſſertion. In all large cities, where the poor, that is the majority of the inhabitants, are crowded together in cloſe, and filthy quarters, this additional loſs every year is very conſiderable.

SECT. VII.

Of the different Effects produced by the Increaſe of the human Species, according to the particular circumſtances of their Situation.

WHAT we have been advancing leads us naturally to make ſome obſervations concerning the increaſe of the human race. Some people imagine that it cannot be too extenſive: they ſpeak of population as an event which always contributes to the welfare of a ſtate, and as ſuch meriting the encouragement of the ſovereign. But the truth is, that the conſequences widely differ according to the ſtate of the country where it takes place. Amongſt a free and enlightened people, who are ſecured by the ſituation of their country, or any other means, from all foreign invaſion; where every tract of land may be improved, the human race cannot be too numerous. In ſuch a nation every man enjoys an eſtabliſhment, is protected by the laws from the aſſaults of individuals, and by the ſtrength of the ſtate againſt the attack of foreign enemies. Here agriculture, the manufactures, and the arts and ſciences in general, moſt commonly flouriſh. Here, every ſpot of ground turns to ſome account; and thoſe commodities which the country will not produce, are brought by commerce from diſtant climates. Who could have imagined that the concourſe of people who retired to Holland, in the time of the duke of Alva, could have found ſubſiſtance there? But it was ſufficient for this people to have known the arts and ſciences, and to have found a retreat where they could apply themſelves, without moleſtation, to procure thoſe ſupplies by induſtry, which this marſhy ſoil refuſed to yield them.

But although there are ſome countries where the increaſe of the human ſpecies is always advantageous, there are others where it is pernicious. There are countries, where, as Monſ. de Monteſquieu expreſſes it, a man is worth nothing *(b)*; there are others where he is worth leſs than nothing. Of the firſt claſs are thoſe civilized nations, where, by ſome change of circumſtances, the reſources are leſs numerous than the inhabitants; where numbers are, of conſequence, out of employ, and uſeleſs to the ſtate. Such again are the countries where the air, the proviſions, manners of living, &c. are favour-

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(*b*) Eſprit des Loix, liv. 22. c. 9.

able, but want of fertility is injurious to population. As is the caſe in China.—— Of the ſecond claſs are the countries inhabited by Savages and Barbarians that live by hunting, or upon the milk of their cattle; and conſequently demand a large extent of land for their ſupport. To introduce new inhabitants into theſe countries, is to introduce violence, rapine, and murder; for they could only ſubſiſt by plundering the natives. The inhabitants of Canada ſufficiently exemplify this aſſertion. They are conſtantly increaſing; they till no ground, and are inceſſantly employed in deſtroying each other, that they may not be deſtroyed by famine. Such was formerly the occupation of the Germans, Gauls, Illyrians, and all the ancient inhabitants of Europe, whoſe ſituation was exactly the ſame with that of the preſent inhabitants of Canada. They were perpetually at war with ſome of their neighbours; and, in a time of general peace, their aſſemblies authorized wars amongſt themſelves; ſo that when their ſoldiers were not employed abroad, the people deſtroyed each other by civil commotions at home *(i)*.——To introduce agriculture into theſe countries, without changing their manners and government, would be to increaſe the evil inſtead of affording a remedy. For as theſe people are divided into ſeveral ſmaller, independant, and vagrant nations, who conſider robbery as lawful and honourable (*k*), they, who ſhould apply themſelves to agriculture, would be the more expoſed to the violence of others; while, at the ſame time, they would be unaccuſtomed to arms; that is, to the only means of ſelf-defence. The ancient Germans did not cultivate the earth, leaſt, as they ſaid, cuſtom ſhould give them a greater reliſh for this employ than for war, and leaſt the ſtrong ſhould plunder the weak (*l*). They

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(*i*) Pellontier's Hiſtory of the Celts, tom. 1. p. 420.

(*k*) Cæſar de Bel. Gal. lib. vi.

(*l*) Cæſar, ibid.

had alſo a cuſtom, which greatly corroborates what we have advanced: they converted all their frontiers into deſerts, and interpoſed extenſive wilds betwixt themſelves and their enemies; in order, as they ſaid, to take away every inducement to their ſettling near them; and to prevent alſo any ſudden attack (*m*). This was certainly the moſt effectual method of keeping a people at a diſtance, who, for the moſt part, never waged war againſt their neighbours, but for a ſupport. They alſo ſtored their proviſions in caverns dug in the earth, not only to preſerve them from the cold, but to ſecrete them alſo from the enemy. When an enemy arrives (ſays Tacitus upon this occaſion), they ſeize whatever they can find; but they are either ignorant of that which is buried and ſecreted under ground, or return without it rather than take the trouble of ſeeking it (*n*).

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(*m*) Cæſar de Bel. Gal. lib. vi.

(*n*) Si quando hoſtis advenit, aperta populantur:

Let us ſtop here to make one obſervation, which whilſt it confirms our ideas relative to the different effects of multiplication amongſt the human ſpecies, may ſerve alſo to illuſtrate a point of hiſtory that ſtands in need of elucidation.

Europe was formerly in a ſituation very different from the preſent. Multitudes of Barbarians, whom the fear of their enemies was no longer able to keep in a poſture of defence, upon the ſea coaſts and mountains of the North, made continual emigrations from their own habitations towards the ſouthern countries, ſpreading deſtruction every where till they were themſelves deſtroyed. Towards the fifth century they ſuppreſſed, and finally defeated, the Roman empire: they conquered France, Spain, Sicily, England; and at length, when they were ſatiated with

tur: abdita autem & defoſſa ignorantur, aut eo ipſo fallunt quod quærenda ſint. Tacit. de Mor. Ger. c. 3.

blood and ſpoil, and became willing to eſtabliſh themſelves in theſe parts, they ſuffered from their countrymen the ſame fate they had inflicted upon the firſt inhabitants. The empire of the Goths, which ſucceeded to that of the Romans in Italy, yielded in its turn to the Lombards. The Franks, who eſtabliſhed themſelves amongſt the Gauls, ſuffered in the ſame manner from the Huns, Normans, and other Barbarians. In England, the Saxons, after having ſubdued the primitive inhabitants, were, in their turn, overrun by the Danes; and both of them afterwards ſubmitted to the yoke of the Normans. For more than five centuries nothing was ſeen in Europe but a perpetual influx and reflux of people. Towns ſacked, countries laid waſte, empires overturned. As theſe inundations are no longer obſerved, a concluſion has been drawn that the human race is no longer ſo numerous as it was formerly. But this is meer conjecture. How was it poſſible for uncultivated lands, in part over-run with enormous foreſts; in part deſerts, inhabited by ſavage people *(o)*, that gave the palm to all the fiercer virtues, and who held humanity as a contemptible weakneſs; how was it poſſible for countries, where their principal ſupply was from hunting, to contain a larger number of people than their preſent cultivated ſtate would ſupport *(p)*? It is indubitable that were the northern part of Europe in the ſame ſituation at preſent as it was formerly, it could no longer contain all its inhabitants than it did at that period. The Saxons, Danes, and all the people who inhabit along the coaſt of the Baltic, would be ſtill neceſſitated to imitate their anceſtors, and ſally forth to cut the throats

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(*o*) Terra ſi aliquando ſpecie differet, & in univerſum tamen aut ſylvis horrida paludibus fœda. Tacit. de Mor. Germ. §. 5.

(*p*) Terra multis impedita fluminibus, multis montibus aſpera & magna ex parte ſylvis aut lapidibus in via. P. Mele.

of their neighbours in order to procure a ſuſtenance. The cauſe of this change in Europe is therefore to be aſcribed to the progreſs which the arts and ſciences have made ſince that period. In ſo uncultivated a ſtate it could by no means yield ſupplies proportionate to the increaſe of the ſpecies. Every new generation, denied a ſuſtenance by the country that gave them birth, were obliged to ſeek it elſewhere. And as they every where found the ſame plenitude of inhabitants, and ſcarcity of proviſions, they ſaw themſelves under a neceſſity of deſtroying others, or periſhing themſelves. From hence aroſe that ferocity of manners, thoſe conſtant emigrations, ravages, and murders. "Warriors and robbers by inclination," ſays Monſ. Pellontier, ſpeaking of the ancient inhabitants of Europe, "they became ſo "in ſome meaſure by neceſſity. Where "men are ignorant of every art or employment; where it is diſhonourable "to live by labour, and no other trade

" has been acquired than that of arms, " they muſt inevitably want a multitude " of neceſſaries in a time of peace. They " muſt either ſubmit to die of hunger, or " kill and plunder others. This was " formerly the honourable, and the only " employ of the Spaniards, Gauls, Britons, Germans, Illyrians, Thracians, " Ligurians, and of all the people of Europe in general (*q*)." Now the earth is cultivated, manufactures flouriſh, and by means of commerce and navigation, every country makes a mutual exchange of its ſuperfluities, theſe invaſions ceaſe; every man finds employ and ſupport at home: they are no longer compelled by neceſſity to ſally forth, like ſo many hungry wolves from their retreats, and fall upon their prey. And if there are ſtill ſome countries in Europe, where the produce is not in proportion to the increaſe of the inhabitants, the conſequences are no longer ſo injurious; as the ſurplus may

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(*q*) Pellontier's Hiſtory of the Celts, l. 2. c. 2.

go into foreign countries, where the arts and ſciences afford them the means of ſupport. Switzerland ſends annually ſeveral thouſand men into other countries: numbers alſo quit Germany. England alone is able, by means of its colonies, to drain off the ſuperfluous inhabitants of Europe.

Yet it muſt be acknowledged, that although the arts and ſciences collect and ſupport great multitudes of people in thoſe countries where they are cultivated, yet they accelerate their deſtruction alſo. The dangers to which ſome are expoſed, the labours others endure, and particularly the exceſs of luxury and effeminacy which are conſtant attendants upon theſe improvements, are in reality ſo many powerful cauſes, which conſpire to produce this effect. But we are not to conclude from hence, as a certain recent author has done, that the ſtate of the inhabitants of Europe is leſs deſirable than that of the

Caraibees or Hottentots; and that a man who cultivates the Muſes is, upon this account, leſs happy than if all his knowledge was confined to leaping, running, fighting, ſlinging of ſtones, and climbing of trees; than if his whole employment was to ſatisfy his wants, and lay down without further care, and ſleep at the foot of a tree, like a dog or a ſwine. Theſe are ideas formed at random from looking at the ſurface of objects only; and conſequently ideas which can never ſerve as a foundation for truth. The arts and ſciences have, it is allowed, their inconveniences; but are theſe equal to the advantages derived from them? Are they to be compared with the evils that accompany the neglect of them? Nay, are even theſe inconveniences deſtitute of utility? And may they not ſerve to reſtrain that too great propenſity to an immoderate increaſe of population, which would otherways take place? Theſe are queſtions, it is obvious to every one, that ought to be carefully examined, before we can paſs a final ſentence upon their real and final conſequences.

SECT. VIII.

Of the coercive Powers neceſſary to every Species.

LET us now return to our ſubject, from which we have digreſſed, in order to combat a ſyſtem that does not deſerve perhaps ſo much attention. We undertook to prove that, in certain circumſtances, the human race is always injured by its own increaſe. And what we have remarked concerning the inhabitants of Canada, and of every nation in general where the arts and ſciences are neglected, renders this truth indiſputable. We have ſeen alſo, with reſpect to the other ſpecies, that if they were left entirely to themſelves, they would all, without exception, increaſe to their own prejudice, as well as to that of others. We have ſeen that a ſuperabundance of any one ſpecies is ſufficient to ſpread a general mortality over the whole animal Syſtem. —— Let us ſuppoſe for a moment, that all of them ſurmounted at the ſame time the obſtacles oppoſed to their increaſe, and that they multiplied to an exceſs ſimilar to that which has been known to take place in ſome particular ſpecies; what muſt be the conſequence of this phenomenon? It is ſelf-apparent that it would terminate in the total extinction of life, and that too in a very ſhort time. It is therefore to the advantage of each ſpecies that there are obſtacles to oppoſe their progreſs.

Providence has accordingly provided for the welfare of the animal ſyſtem in this reſpect. Her firſt ſtep has been to preſcribe bounds to each ſpecies, which ſhe does not permit any of its individuals to paſs. Although this term is more remote in one claſs of animals than another, yet we may aſſert that it is of ſmall duration with regard to thoſe who live the longeſt. So that, whatever care an animal may take to preſerve itſelf, whatever vigour it may poſſeſs at a certain age in life, there is a term it cannot exceed, and in proportion as this approaches, we ſee the animal change, weaken and vaniſh: like thoſe fires which are kindled in the night, to burn no longer than the dawn of the morning. This firſt method that Providence employs to maintain a juſt equilibrium in the animal ſyſtem, operates powerfully upon ſome particular ſpecies only. There are others upon which it makes little or no impreſſion; ſo very extenſive and ſudden is their increaſe! With reſpect to theſe, Providence employs the inclemency of the ſeaſons, during which they are either deſtroyed, or remain in a torpid ſtate. And it is by theſe means alone that thoſe terrible inundations are prevented, which muſt inevitably take place, if they continued to multiply, perhaps a few weeks longer. It is alſo to ſet bounds to their increaſe, while they are in the height of vigour, that Providence has introduced into the World a multitude of Animals to feed upon their ſubſtance. And as the law of propagation in the frugivorous race, is ſuperior in its effects to the law which decrees the extinction of each individual after a certain term, Providence to counteract theſe effects, ſo as to maintain the juſt balance, has alſo ſubjected them to the depredations of the carnivorous race.

It is then clear to a demonſtration, that the introduction of the carnivorous race into the animal ſyſtem, is by no means injurious to the other ſpecies, but that on the contrary, it is advantageous to them. For they are no more than the barriers nature has oppoſed to thoſe inundations of which we have been ſpeaking? And ſince theſe barriers are abſolutely neceſſary, what can be more conformable to the rules of wiſdom, than to employ the living ſubſtance itſelf for this end? Thus does it act as its own counterpoiſe; and the exceſs of life in one ſpecies, ſerves to ſupply the want of it in another.

Compaſſion may aggrandize in our eſteem the depredations which the different ſpecies commit. And a certain diſtruſt of ourſelves might tempt us to conſider them as ſo many curſes inflicted by a Superior diſatisfied with his works. But if we judge according to experience and facts, we ſhall have very different ideas. It is now five thouſand years at leaſt that the world has ſubſiſted, and that men in alliance with lions and tygers have waged war againſt the other animals— For, with the permiſſion of the poetic gentry, I believe that thoſe times, thoſe happy times, when men lived upon acorns, when lions and tygers were ſo courteous as to lick the feet of thoſe that played upon the Lyre, never exiſted but in their brain—It is, I ſay, five thouſand years at leaſt that one part of the living ſubſtance has waged continual war with the other, yet we do not find that this Law of Nature has to this day occaſioned the extinction of any one ſpecies (*r*). Nay, we may add, it is this which has preſerved them in that ſtate of perpetual youth and vigour in which we behold them.

Without this wiſe and ſalutary Inſtitution of Nature, life would long ago have broke through that juſt equipoiſe which is the only preſervation of the different ſpecies, and muſt of conſequence have ſuffered a total extinction. The effects of the carnivorous race, with reſpect to the other ſpecies, are exactly the ſame as that of the pruning-hook with reſpect to ſhrubs which are too luxuriant in their growth, or of the hoe to plants that

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(*r*) No one ſpecies, ſays Mr. Ray, is as yet loſt, that has been mentioned in hiſtory: and we may of conſequence venture to conclude, that every one of them is preſerved.

Ray's Wiſd. of God in the Creat.

grow too cloſe together. By the diminution of their number, the others arrive at greater perfection.

SECT. IX.

Of the Equilibrium eſtabliſhed by Nature betwixt the different Species in the Animal Syſtem.

OF ſo great utility is the Law of Nature, which enjoins, that one part of the living ſubſtance ſhould feed upon the other, that it is the baſis of the order and well-being of the whole animal ſyſtem. We accordingly find that Providence has extended its empire over every ſpecies. They are all of them, from the ſmalleſt to the greateſt, expoſed to enemies ready to check their progreſs, and furniſhed with the arms and faculties neceſſary for this effect. To thoſe ſwarms of Inſects and reptiles that cover the ſurface of the earth, are oppoſed an army of birds, an active, vigilant, voracious race, which ſeem created for their deſtruction. Hares, rabbits, rats, mice, field-mice, and all thoſe animals, which multiply with ſo much facility, are expoſed both to the depradations of birds and quadrupeds, active as themſelves in all their motions, endowed with ſuperior ſtrength, and with a more penetrating eye. The amazing bulk of the horned cattle, the lightneſs of the deer, the ſtrength and ſwifneſs of the horſe; all theſe qualities do not exempt thoſe that enjoy them from this order of Nature. She has formed numberleſs other animals which poſſeſs the ſame faculties to a greater degree, and which employ them in the deſtruction of the former. The carnivorous animals find in their turn, that the human race are furniſhed with numberleſs reſources to check their increaſe, and prevent their multiplying beyond certain limits. Man is appointed to watch over all the other ſpecies, and maintain the balance betwixt them. In this conſiſts his empire over the other animals. This is one reaſon why Providence has ſo cloſely united mankind together, and given them that underſtanding which ſhe has refuſed to the reſt of the creation.

SECT. X.

Of the Obſtacles which oppoſe the Exceſs of Population in the Human Species.

THIS ſuperiority of the human ſpecies is ſo far a ſecurity at leaſt from the devaſtation of the others, that none of them can be regarded as a ſufficient check to its progreſs. Yet, ſince it is upon the human race, as well as every other, that nature has laid this injunction, "Increaſe and Multiply;" there is no doubt but we are alſo ſubject to that other law which regulates the limits of each ſpecies. And in fact, many are the obſtacles oppoſing its progreſs: if the carnivorous animals are not able to effect any conſiderable diminution in the number of its individuals, the human ſpecies frequently turns its force againſt itſelf, in order to avoid being overcharged with life. Men are frequently to each other, what the carnivorous race are with reſpect to other animals. Hobbes ſuppoſes that they are born in a ſtate of warfare. This opinion, reſpecting individuals, is falſe: the organs, faculties, neceſſities, deſires of men, every principle within them, ſhews that they are formed for ſociety; and the more they are united in affection and good-will, the nearer do they approach to a ſtate of nature. It is falſe alſo with reſpect to civilized nations, and their mutual connections. For although the hatred, jealouſies, diſtruſt, and eſpecially the national prejudices they harbour againſt each other, ſeem to countenance this opinion; ſuch however are the reſources civilized nations enjoy, by the cultivation of the arts and ſciences, that they are never reduced to the cruel neceſſity of going to war. Thoſe who ſeek it are inſtigated by a principle of ambition, vain glory, and revenge, more than by any other motive. But the caſe of thoſe who neglect the arts and ſciences, eſpecially agriculture, is widely different. As the law of multiplication produces all its effects amongſt theſe, without their being counterbalanced by luxury, or any other obſtacle, it muſt of conſequence excite wars. For where could thoſe ſucceſſive multitudes which appear in every generation find ſubſiſtence, did they not ſeek it by arms? Tacitus repreſents accordingly the ancient Germans as avowed enemies to peace (*u*). And Florus ſpeaking of the Sarmatæ, ſays, they are ignorant of its very name (*x*). Quintus Curtius ſays alſo, that the ancient Scythians were always armed (*y*). It is true agriculture appears to us, who are civilized, as an art in the power of every

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(*u*) Tacitus de Mer. Germ.

(*x*) Flor. lib. iv. c. 12.

(*y*) Quint. Curt. lib. vii. c. 7, 8.

man; but we have already proved that this is by no means the caſe. "Suppoſe yourſelf alone," ſays Monſ. Monteſquieu, "and that you arrive by chance in a ſtrange country, if you find a piece of money, be aſſured that you are in a civilized nation. Cultivation of lands requires the uſe of money; it neceſſarily ſuppoſes alſo, no ſmall proficiency in the arts and ſciences. And we may obſerve, that the arts, ſciences, and the wants of mankind, always keep pace with each other *(z)*." A very ſenſible modern author is not leſs explicit upon this article. When nations are intermixed, it is long before they become civilized, or even before their language is formed: ſome again are civilized ſooner than others. A regular plan of government is eſtabliſhed, and the arts are introduced with ſo much difficulty; revolutions ſo frequently ſubvert the riſing edifice, that the greateſt ſubject of wonder is, that nations in general do not continue to live like the Tartars (*a*). With reſpect to thoſe people that do not cultivate the arts and ſciences, we may admit the aſſertion of Hobbes, which Plato before him has, in his dialogues, put into the mouth of Clinias (*b*). "The ſtate of civil ſociety, reſpecting each other, is a natural ſtate, that is a ſtate of enmity; ſo that if a war ſhould be diſcontinued, it is not, properly ſpeaking, a permanent peace, but a ſuſpenſion of arms." (*c*) *

(z) Eſprit des Loix, l. 18. c. 15.

Amongſt

(*a*) Voltaire's Hiſt. of the Ruſ. Empire.

(*b*) Lib. 1. Prin. de Leg.

(*c*) De Cive. * The Chriſtian Religion commands, if *thy enemy hunger feed him, if he thirſt give him drink.——Whoſoever ſhall ſmite thee on thy right cheek, turn to him the other alſo. And if any man will ſue thee at the law, and take away thy coat, let him have thy cloke alſo; and whoſoever ſhall compel thee to go a mile, go with him twain.* Theſe are the injunctions of chriſtianity: but upon whom are they enforced? Upon the diſciples forming a civil government, and conſidered with

Amongſt other obſtacles to an undue increaſe of the human ſpecies, we may conſider famine and peſtilence. Theſe are terrible calamities ; yet they are unavoidable, where men have too long enjoyed

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with regard to the connection they might have with other civil governments ? It would be a reflection upon the wiſdom of its inſtitutors to believe this. The primitive chriſtians could not be conſidered in this light ; and ſuppoſe this poſſible, the command would have been unreaſonable. Societies undoubtedly owe to each other an exact obſervance of the laws of juſtice ; but their tranquility and intereſt would not be greatly promoted by reſtraining them to theſe acts of extream condeſcenſion, this depth of humiliation ; and the impetuoſity of human paſſion muſt be but little known to believe it poſſible. Theſe maxims were addreſſed to men, who were to be diſperſed over the earth, and who by their patience, moderation, gentleneſs, and humility, as well as by working of miracles, were to convert men to the chriſtian religion, and to triumph over the malice of their enemy. They regulate the duties, not of communities, but of individuals towards each other, and in this ſenſe they are full of wiſdom and importance.

uninterrupted proſperity, and exceeded the proper limits of population. It is for this reaſon alſo, that Providence frequently intermixes with the common bleſſings of life, the miſeries of war.—War is doubtleſs terrible, but it by no means preſents to our view, ſuch a horrible ſpectacle as the plague or famine. Human nature can only oppoſe ſighs and groans to theſe evils, as it is not in her power to govern thoſe ſecret and inviſible agents, I mean the ſecond cauſes, which occaſion them. But as war is the machination of men, they know the beſt or the worſt conſequences it can produce, and may prepare for the event. If a nation is attacked, violence may be oppoſed by violence, rapine by rapine, ſlaughter by ſlaughter, and in the tranſport of their rage, men feel not the blows they receive. When a Hero falls in battle, the *dulce & decorum pro patria mori*, or ſome other animating motive, affords him conſolation: ſo that a ſecret ſatisfaction ſhall be intermingled with his ſufferings.

ings. Who can forbear admiring the Roman fathers, who after the fatal battle of Cluſium, not being able to retire to the capitol, voluntarily ſubmitted themſelves to death, and expected its approach in the utmoſt tranquility, ſeated upon their thrones of ivory, and clothed with all the enſigns of dignity? Who does not admire the conduct of Regulus? After having adviſed the Roman Senate to reject the terms propoſed by Carthage, he tears himſelf from the arms of his wife and children, and returns to Carthage to ſuffer the puniſhment this cruel people had prepared for him (*d*). Any one that reads the hiſtory of Canada, will find to what a de-

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(*d*) Fertur pudicæ conjugis oſculum,
Parvoſque natos, ut capitis minor,
Ab ſe removiſſe & virilem
Torvus humi repoſuiſſe vultum;
Donec labantes conſilio patres
Firmaret auctor nunquam alias dato,
Interque mœrentes amicos
Egregius properaret exſul.
Hor. Od. l. iii. od. 5.

gree nature adapts men to that kind of life, they are deſtined to paſs. Theſe people being always engaged in hunting and war, and having every thing to fear from the barbarity of their enemies, ſhould they fall into their hands, are the moſt patient and moſt courageous of mortals, in the midſt of their ſufferings. "Nothing is "more common," ſays Charlevoix, "than to ſee perſons of each ſex, and "all ages, ſuffer for ſeveral days together "all that anguiſh which fire can excite, "or which buſy rage can invent to render it more excruciating, without letting a ſigh eſcape them. Their only "employ, even in the midſt of their "ſufferings, is generally to exaſperate "their executioner, by the moſt cutting "inſults (*e*)."

This was the character of the Europeans alſo before they were civilized. They exerciſed a ſimilar cruelty towards their

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(*e*) Charlevoix Journal Hiſt. tom. vi. let. 21.

priſoners *(f)*, and thoſe who had the miſfortune to fall into the hands of their enemies, ſhewed a ſimilar fortitude in the midſt of their tortures *(g)*.

(f) Nihil interius per omnia id tempus reſiduum crudalitatis fuit in captivos ſævientibus. Litare diis, ſanguinem humanum bibere in oſſibus capitum, & cujuſque modi ludibrio fædare mortem tam igni quam fumo, partuſque gravidarum extorquere tormentis.

Flor. l. iii. c. iv.

Galli in Callienſes dira & omnium, quæ unquam ad aures noſtras pervenerint, atrociſſima edidere facinora.

Pauſan. Phoc. xxii. p. 851.

(g) Ex captivis Sogdianorum, triginta nobiliſſimi corporum robore eximio perducti erant. Qui, ut per interpretem cognoverunt, juſſu regis ipſos ad ſupplicium trahi, carmen lætantium more canere, tripudiiſque & laſciviori corporis motu, gaudium quoddam animi oſtentare coeperunt.

Quint. Curt. l. vii.

Et illud etiam deſipientiæ Cantabrorum tribuunt, quod nonnulli capti & in crucem noti pæanas canebant.

Strabo, l. iii.

The cultivation of the arts and ſciences prevents wars, prevents famine, and perhaps it may, to a certain degree, prevent the plague, by thoſe changes it introduces in the manners of men, in their dreſs, dwellings, food, and general method of living, particularly by cleaning the ſoil, which gives a free circulation to the air, and of conſequence renders it the more ſalutary. But although the arts and ſciences may baniſh, in ſome meaſure, theſe evils, yet they introduce others, which are no leſs influential, tho' they are not ſo ſudden in their effects. Such as luxury, effeminacy, ſenſuality, debauchery, which are ſo many impediments to a detrimental increaſe of the human ſpecies. Nature is ſimple and uniform in its courſe; this being the only means of promoting the intereſt of mankind. To precipitate its courſe, is to expoſe it to numberleſs evils, it is to deſtroy it. But luxury, effeminacy, ſenſuality, change the courſe of nature by creating new deſires, and loading it with ſuperfluous cares. Thoſe who give themſelves up to theſe vices, it is certain, cannot eſcape with impunity; and when we reflect how much the conſtitutions of children are influenced by thoſe of their parents, we may with juſtice exclaim *non his juventis orta parentibus.* It is not from the offspring of ſuch parents, parents enervated by effeminacy, and ruined by debauchery, that the propagation of the human ſpecies is to be expected.

Another inconvenience alſo attends a cultivation of the arts and ſciences. That ſtudious and ſedentary life to which numbers are deſtined, has no leſs power in exhauſting the animal ſpirits, and deſtroying the health, than the cauſes we have already mentioned. And what ſhall we ſay of thoſe laborious and pernicious employments, of thoſe many dangerous profeſſions, which ſpring from this ſource? Such as, for example, working in mines, navigation, travelling into foreign countries.—Thus if we duly conſider the effects produced by the arts and ſciences, we ſhall find that notwithſtanding they contribute, in ſome reſpects, to the increaſe of the human ſpecies, yet in others, by ſpreading a ſecret poiſon, they retard their progreſs, and ſerve as correctives to the exceſs of population, that muſt otherways ariſe from the peace and tranquillity which the arts and ſciences introduce. And ſince their effects are without violence; ſince they do not diſturb any eſtabliſhed order, and ſince they are ſcarcely perceived, we conceive them as harmleſs, compared with peſtilence, famine, and war. Calamities theſe, which muſt inevitably be the lot of a people that neglect to cultivate them.

So true is it that nature has preſcribed limits to the propagation of men, that they have ſometimes exceeded her intentions in this reſpect, and impoſed laws upon themſelves to check the increaſe of population, which nature has never enjoined: “ In China and Tonquin parents “ are permitted to ſell or expoſe their “ children. In the iſland of Formoſa, “ their religion prohibits women from “ bringing forth children till they are “ about 35 years of age. Before this period “ the prieſteſs finds means to procure an “ abortion. The ſame effect (ſays Monſ. “ Monteſquieu, from whom I have borrowed this article) (*b*) which phyſical “ cauſes produced in ſome of the eaſtern “ countries, took place in Greece from “ the nature of their government. In “ a ſmall and flouriſhing territory, the “ number of citizens muſt ſoon augment, “ ſo as to become a burden. This people of conſequence omitted nothing “ which might prevent an undue increaſe “ of children. Their politics were more “ immediately confined to the regulation “ of the number of citizens. Plato limits

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(*b*) Eſprit des Loix, tom. ii. c. 16, 17.

" it to five thouſand and forty, and
" recommends, according as the caſe may
" require; either the prohibition or encouragement
" of propagation, by motives
" of honor or ignominy, and by the
" ſeaſonable admonitions of the elders.
" He adviſes alſo a regulation of the
" number of marriages, in ſuch a manner
" that the loſſes of the republic may be
" conſtantly repaired, without its being
" burdened with members. Where the
" laws of the country forbid the expoſing
" of their children, ſays Ariſtotle, every
" parent ſhould be limited to a certain
" number. And when the children are
" more numerous than the laws permit,
" he adviſes the women to procure abortion
" before the fœtus be endowed with
" life. Ariſtotle further obſerves, that
" there are countries where the laws admit
" ſtrangers and baſtards, or children
" whoſe mother only was a free woman,
" into the number of citizens; but when
" they are ſufficiently numerous, this

" privilege is ſuſpended." The ſavages of Canada burn their priſoners ; but if they have any empty cabins to diſpoſe of, they give them to their captives, and acknowledge them of their nation.

What we have alledged ſufficiently proves, that Providence has ſubjected men as well as other animals, to that law of nature, which ſets boundaries to the number of individuals in every ſpecies. She has not expoſed men to the fury of the brute creatures, but ſhe has divided them into diſtinct bodies, which are conſtantly claſhing againſt each other, and which always loſe ſome of their bulk by their reciprocal attrition. She has alſo ſubjected them to various coercive cauſes, one or other of which is continually acting upon them, in every ſituation, and prunes off thoſe luxurious branches, that are injurious to the animal, as well as to vegitative life.

We have enlarged the more upon this truth, as it is here principally that our ſyſtem oppoſes the opinions generally received. To ſhew men the conſtant and uniform action of certain cauſes in the inferior parts of the animal creation, is ſufficient to make them comprehend the deſigns of Providence in the operation of theſe cauſes. But when we ſpeak of the effects produced upon themſelves, they are with difficulty convinced that Providence has deſtined them to the very ſame end. The teſtimony of their eyes and ears are, in this reſpect, confronted by the deciſions of a judge, to which they pay a greater deference ſtill; I mean their pride. They cannot be perſuaded that beings, endowed with intelligence, and deſigned to be the maſters and governors of other animals, ſhould be joined with them, in ſubjection to thoſe laws which regulate and confine the number of individuals of every ſpecies. But as long as they give themſelves up to ſuch ideas, they muſt be blind to the order, beauty, and excellence of the animal ſyſtem: they will diſcover nothing but diſorder and confuſion, as they will find every phænomenon that takes place, directly oppoſite to the conceptions they have entertained of infinite wiſdom and goodneſs. Let them, on the other hand, acknowledge their dependence upon the general laws, which nature has eſtabliſhed for the production and conſervation of an immenſe quantity of life in the univerſe; let them only acknowledge, that with the powers of propagation, which they enjoy in common with all other ſpecies, they muſt be ſubjected to the ſame conſequences, and they will find thoſe imaginary irregularities vaniſh, that are ſuch obſtacles to their faith; they will find that the wars, diſorders, infirmities, and accidents, to which they are expoſed, and by which ſuch numbers are daily cut off, have, beſides the moral reaſons we might mention, phyſical ones, alſo, that ſufficiently juſtify their introduction in the world.

SECT. XI.

Particular Inſtances given of this coercive Power in the Animal Syſtem.

THERE is no ſpecies, I believe, but what ſtands in need of this coercive force, to confine it within its proper boundaries. This is a neceſſary conſequence of that law of propagation which was given to all; and the various phænomena to be remarked in the animal ſyſtem, unite to ſupport this ſuppoſition. Nature employs various powers, which oppoſe, in every ſpecies, the pernicious increaſe of their individuals. Men ſhe has ſubjected to wars, peſtilence, famine, diſeaſe and infirmities. The carnivorous animals, which ſhe has put under the dominion of men, are appointed in their turn to ſerve as a barrier to the undue multiplication of the frugivorous race. And ſome of them diſcharge this office with ſo much cunning and addreſs, that they clearly diſcover this to have been the deſign of Providence in their formation. We have already given ſome examples; we will add ſome others, that we may place this important truth in the moſt conſpicuous point of view poſſible.

"The crocodiles," ſays Don Ulloa, ſpeaking of the river Guyaquil, "are "moſt deſtructive enemies to the fiſh "which this river produces; they chiefly "feed upon them, and catch them with "as much artifice as the moſt able fiſherman. "Eight or ten of them combine "together, and place themſelves in a line "acroſs the mouth of a river or canal, ſo "that no fiſh can paſs without becoming "their prey: yet they are obliged to make "the attempt; for while this eight or "ten watch at the mouth of the river, "there are others that drive the fiſh before "them down the ſtream. When "they are deſtitute of fiſh, and preſſed

" with hunger, they ſeek the land, and
" frequent the plains bordering upon
" ſome river or brook: calves and young
" colts are not exempt from their fury;
" and after they have once taſted of their
" fleſh, they retain ſuch a reliſh for it,
" as not to care any more for fiſh. They
" now hunt after men and other animals;
" they ſally forth when it is dark, and
" ſurprize their prey under covert of
" the night.

" As alligators are oviparous animals,
" and the female lays upwards of a hundred
" eggs in the ſpace of a day or two,
" their multitudes would in a ſhort time
" depopulate the places they frequent of
" every other inhabitant, did not Provi-
" dence interpoſe a reſtraint, by rendering
" them, in their turn, tributary to other
" ſpecies. When the female wants to lay,
" ſhe comes on ſhore, and depoſits her eggs
" in a hole which ſhe digs for that purpoſe
" near the borders of the river; ſhe then

" covers them with ſand, and has the precaution to roll over the place itſelf and " the parts adjacent, in order to conceal " the more effectually the ſpot where " they are repoſited, and diſconcert the " enemies of her ſpecies. Having thus " provided for their ſecurity, ſhe returns " to the water, and leaves them to " quicken until the time that nature has " taught her it is neceſſary to hatch them. " She then returns with the male, removes the ſand, finds the eggs, and " breaks their ſhell. The young allegators immediately come forth, and " they are ſo ſecure from accidents, that " ſcarce a ſingle egg ſhall be loſt in a " whole brood. As ſoon as they are " hatched, the mother takes them upon " her back, and about her neck, and " makes to the water with this new " race: but in the mean time the gallinazo, always upon the watch, carries " off ſome of them, and the male alſo " devours as many of them as he can

“ catch. The female herſelf deſtroys
“ thoſe that are ſeparated from her, or
“ are that not able to ſwim: ſo that there
“ ſhall ſcarce be five or ſix remaining
“ out of ſo numerous a brood.

“ Theſe gallinazos are no leſs ac-
“ tive and cunning in deſtroying the
“ race of crocodiles, than the latter are
“ in catching fiſh and other animals.
“ They are particularly fond of their
“ eggs, and employ amazing dexterity
“ to ſeize them. At the ſeaſon that the
“ female depoſits them by the ſide of the
“ river, they ſtand centinel upon ſome
“ adjacent tree, and hide themſelves a-
“ mongſt the branches and leaves ſo as
“ not to be ſeen: they permit her to lay
“ her eggs without moleſtation, nor do
“ they ſo much as interrupt her precau-
“ tions to conceal her treaſure: but the
“ moment ſhe turns her back, they pitch
“ upon the neſt, and by means of their
“ bills, claws and wings, uncover the

"eggs, which they inſtantly devour. — "Let us admire the wiſdom of Providence," ſubjoins this excellent author, from whom we recite theſe peculiarities; "let us admire the wiſdom of Providence, "which has given to the male crocodiles "this propenſity to devour the young, "of which they are the parents, and to "the gallinazos ſuch a deſire after the "eggs of the female. Without this, "neither could the waters or the plains "be able to contain the number of crocodiles, "that would be produced from "ſuch a quantity of eggs; for notwithſtanding "the deſtruction made by the "one or the other, it is impoſſible to "conceive how many ſtill remain (*i.*)

There is in the American iſlands a bird, called frigate, which intercepts the flying fiſh in that ſhort interval it is out of the water. What ſtrength, addreſs and activity muſt be neceſſary for this purpoſe!

(*i*) Voyage de Don Ulloa, liv. v. chap. 9.

Nature has accordingly endowed it with a particular formation, with a large bill, very much arched and crooked at the extremity, eyes remarkably piercing, legs ſhort and collected, feet armed with ſtiff and crooked claws, its wings are long, but very light; with theſe it ſkims along the ſurface of the water with an aſtoniſh-activity. This bird, ſays father Labat, is found in the midſt of the ocean, three or four hundred leagues from land, which demonſtrates its incredible ſtrength, and aſtoniſhing agility; for as it does not float upon the water like other aquatic birds, it muſt of conſequence fly ſeven or eight hundred leagues before it can repoſe itſelf (*k*).

It is well known alſo that the whale, whoſe amazing ſtrength and bulk ſeem to ſecure it from the inſults of every other animal, is, notwithſtanding, expoſed to the fury of the ſword-fiſh, which nature ap-

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(*k*) Nouveau Voyage du Pere Labat, tom. viii. p. 300.

pears to have formed with an immediate deſign, to act as a check upon it. This animal has, at the extremity of its ſnout, a ſtrong, hard, horny projection, armed on each edge with ſtrait points of the ſame ſubſtance, in the form of flat, ſtrong, and ſharp teeth, which are from fifteen to eighteen lines in length near the ſnout. With this inſtrument it boldly attacks and encounters the whale wherever it meets with her. I have often had the pleaſure, ſays father Labat (*l*), of ſeeing their combat. The tail of the whale is its only defence: with this it endeavours to ſtrike its antagoniſt; and is ſure that one blow would be ſufficient to deſtroy him. The other, as he is more active than the whale, eaſily parries the ſtroke, and ſpringing into the air falls upon her, and attempts, not to pierce her with its ſnout, but to cut or ſaw her with the teeth that arm it; and whenever he ſucceeds, the ſea is dyed red with the blood iſſuing from the wound.

(*l*) Nouveau Voyage, tom. vi. p. 150.

The fury of the whale may be learned from the vehemence with which it laſhes the water; every ſtroke of its tail reſounding like the report of a cannon.

To theſe examples, taken from other countries, let us add that of the Rooks, which we have before us, and which is not unintereſting. The Rook is a ſpecies of Crow that feeds upon worms, and particularly the worms produced from the eggs of the May-bug. As theſe, and all the winged inſects in general, are to be ſupported by the roots of plants, they depoſite their eggs pretty deep in the earth, in a hole they dig for that purpoſe. The worms and caterpillars, upon which the Rook feeds, are not expoſed to the mercy of this bird till the earth is thrown up. Hence it is that Rooks always frequent lands recently cultivated, that the ſight of the huſbandman with his plough, puts them in action, and that they ſearch with ſo much aſſiduity about furrows newly formed.

Some years ago the farmers, in one of the principal counties of England, entertained a notion that theſe birds were prejudicial to the grain; and they determined, as if with one accord, to extirpate the race. The rooks were every where perſecuted; their neſts demoliſhed; their young ones deſtroyed. But in proportion to the decreaſe of this animal, they found themſelves overrun with ſwarms of worms, caterpillars, butterflies, and bugs; which attatched themſelves to the grain, trees and fruits, and occaſioned greater deſolation in one day, than the rooks would have done in the ſpace of a twelve month. Many farmers were ruined. At length this perſecution ceaſed; and they found that in proportion as this race of animals was reſtored, the ſcourge which their deſtruction had occaſioned, ceaſed likewiſe.

Several ſmall birds, particularly the wren and titmouſe, may be ſeen during the winter-ſeaſon in gardens, pecking at the buds and branches of trees. It is to this little animal, that nature has entruſted the charge of ſuppreſſing the progreſs of worms, which feed upon fruits, and which are ſoon ſpread every where when the heat of the ſun revives them in the ſpring. Thus has nature her reaſons for every thing, more eſpecially for the place ſhe has alotted to each ſpecies in the animal ſyſtem. There are none but what have their peculiar utility, either by affording nouriſhment, or ſerving as a barrier to ſome other ſpecies. Their aſſemblage forms a complete whole, which ſupports itſelf by the reciprocal balance of its parts. By extirpating one, you hazard the intereſt of all. For thoſe which appear to us the moſt uſeleſs, may, without our knowing it, ſerve as obſtacles to the injurious increaſe of inſects, or of ſome other pernicious race.

We ſee therefore that nature, however ſhe may be laviſh of the life of individuals, has taken particular care for the preſervation of every ſpecies. She has given a moſt amazing fecundity to all, but eſpecially to thoſe that ſupply the wants of others. She has joined to this, a wonderful ſagacity to diſcover, and addreſs to eſcape the ſnares that are ſpread for them. She has, in conſequence, provided a variety of retreats, by diverſifying the ſurface of the earth with numberleſs woods, foreſts, mountains, and inacceſſible rocks. But, what is yet a ſtronger indication of the care of nature in this reſpect, is thoſe ſentiments of compaſſion with which ſhe has, in ſome meaſure, mitigated the dominion of man over the other animals. Man alone is rendered capable of theſe feelings, as he is the only creature on earth upon whoſe will the preſervation, or total ruin, of a multitude of ſpecies finally depend. It is a miſtake to imagine that our compaſſion is confined to the miſeries of our own ſpecies. There are animals that cannot exiſt without our aſſiſtance: and to theſe nature has given a ſoft and pliable diſpoſition, mild and humble manners, looks full of benignity and innocence; in a word, an aſſemblage of thoſe affectionate qualities, which are moſt proper to awaken in us the feelings of compaſſion. We cannot doubt a moment then, whether nature has formed theſe animals to ſhare with us the ſweets that flow from this benevolent diſpoſition. We accordingly are attentive to their wants. Their ſufferings and groans impreſs uneaſy ſenſations upon ourſelves, which we cannot remove but by giving them relief. And, when the principle of ſelf-preſervation obliges us to exert that authority we have over them, we are ſenſible how juſt it is to ſhorten, as much as poſſible, the pains neceſſarily inflicted.

PART THE THIRD.

IN WHICH

Some Objections that may be made to the Sentiments advanced in this Work, are anſwered.

SECTION I.

The World is governed by general Laws. The Nature of theſe Laws.

IT is with this law of nature which ordains the deſtruction of one part of animal life, for the good of another, as it is with every other law Providence has eſtabliſhed to maintain the order of the univerſe. It may not at all times perfectly correſpond with the good of individuals,

viduals, yet it is wiſe, juſt, and equitable, with reſpect to thoſe beings themſelves whoſe happineſs it ſeems moſt to oppoſe. This truth it is difficult to comprehend, becauſe men in general comprehend nothing beyond the ſphere of their own private wants. To this contracted point of view are all the ſpeculations of the ſceptic confined ; and hence it is that he ſees nothing but diſorder and confuſion in the plan of the univerſe. To this contracted point of view are confined alſo the meditations of every religious man, that is wedded to a ſyſtem, and who of conſequence, whenever he reflects upon the ways of Providence, is as blind to their excellence and juſtice as the infidel or atheiſt. And the better to ſhield himſelf from their attacks, he is obliged to wrap himſelf up in his ignorance ; to call every thing, even the moſt obvious truths, myſteries, beyond the powers of human reaſon to penetrate. Let us leave theſe characters to agree as well as they can ;

we are not to expect the heads of ſuch ſhould become the repoſitories of truth.

Since what may be beneficial to the whole, does not always promote the intereſt of a part, conſidered as unconnected with the whole; ſince univerſal and partial good, are in a certain ſenſe diſtinct objects, and not to be acquired by the ſame means; it is impoſſible but that general laws, laws that have the conſervation of the univerſe itſelf, and conſequently of an infinite multitude of beings, for their object, ſhould at times oppoſe private intereſt, or the intereſt of a part conſidered as diſtinct from the whole: and ſince the preſervation of the whole, is certainly to be preferred to that of a part, the general laws of nature ought to be, for this reaſon, fixt, immutable and perpetual. No creature can infringe upon theſe laws, without a particular permiſſion from him who eſtabliſhed them. He alone is equal to this, who holds the reins of the univerſe, and can with a firm and ſteady hand direct every event and every circumſtance to one general and determined deſtination. To expect that God will ſuſpend the operations of his laws, every time they claſh with the intereſt of individuals, is, of all abſurdities, the greateſt. What! becauſe the waves of the ſea are in danger of overwhelming ſome unthinking wretches that expoſe themſelves to its mercy, ſhall his ſpirit ceaſe to move upon the waters, ceaſe to communicate to them that perpetual agitation which is ſo needful and ſalutary? Shall he ſuppreſs the impetuous winds, and forbid them to drive before them the contagious vapours, becauſe an unfortunate mortal, or a whole family, are upon the point of being buried under the ruins of ſome edifice? Shall he forbid the thunder to roar, the rain to ſwell the torrent, the hail to lay waſte the fields every time intimidated creatures ſhall expoſe their relics, or make vows and proceſſions for this end ? Doubtleſs, not. It is upon the conſtant and uniform action of theſe laws that the conſervation of the univerſe depends. Was it juſt to ſuſpend for once only their effects, in favour of an individual, they muſt be ſuſpended for all. The whole would periſh, and the individual with it. Theſe laws therefore never deviate from the path preſcribed, except in caſes that concern the whole world, and affect, as it were, an intire change in it. Do we not find that ſecond cauſes, which are no other than theſe laws themſelves, are ſtubborn as iron and braſs, with reſpect to us, whenever the general deſtination of things runs counter to our private intereſt ? And what would become of ſocieties ? what would become of the world itſelf, if by our vows and tears we could effect the leaſt change ? Does not one half of mankind beg of God to be deaf to the prayers of the other ? Does not this nation burn incenſe upon its altars, does it not offer its ſacrifices to the

Supreme, to influence him to change the ſongs of triumph, another nation is uttering, into cries and lamentations? Should Providence make the wiſhes and deſires of individuals the rule of his conduct, thoſe general, immutable laws, that wonderful order which reigns in the univerſe, would ſoon give way to trouble and confuſion: that univerſal joy and ſatisfaction obſervable in the animal creation, would ſoon be changed into univerſal conſternation and deſpair.

Let earth unbalanc'd from her orbit fly,
Planets and ſuns run lawleſs through the
 ſky;
Let ruling angels from their ſpheres be
 hurl'd,
Being on being wreck'd, and world on
 world;
Heaven's whole foundations to their
 centre nod,
And nature trembles to the throne of
 God.

All this dread order break—For whom? For thee?
Vile worm!—Oh madneſs! pride! impiety (*n*)!

It is reaſonable that the good of a part ſhould be ſubordinate to the good of the whole; and of conſequence that ſecond cauſes ſhould not be in the power of individuals. But which way, it may be ſaid, will theſe reflections obviate an objection, that naturally ariſes from private evils, occaſioned by this general law of nature under conſideration? For however Providence may have tempered its ſeverities, it ſtill occaſions, ſome will ſay, the misfortune of numberleſs individuals, and often of whole ſpecies themſelves. How often have not the carnivorous animals totally depopulated the places they frequent of every other inhabitant? How often, in the human ſpecies, have not the yoke of

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(*n*) Eſſay on Man, epiſt. 1. l. 251.

conquerors become beyond meaſure inſupportable to the necks of the conquered? We are not ignorant of the facts which gave riſe to theſe objections; but we aſſert that none can be alledged that is not a partial evil, none that is not confined to the events which take place in ſome circumſcribed part of the globe or other, and that for a limited time only: and conſequently none which can ſerve for a general and deciſive rule, with reſpect to the point in queſtion. Let us collect the effects of this law, and conſider their univerſality, not only as relative to the preſent inſtant, but to futurity; not merely as reſpecting a few individuals, but every ſpecies in general; and if upon this examination we ſhould find that it is more prejudicial to life than productive of it, that it occaſions more confuſion than regularity, more pain than pleaſure, more miſery than happineſs, we need not heſitate to call it unjuſt and abſurd. It cannot be the work of a being tranſcendently good. But if we ſhould find the number it injures is ſmall compared with the whole, that the partial evil it occaſions becomes productive of general order, harmony and enjoyment, and what is more, the increaſe of life, we muſt doubtleſs draw the oppoſite concluſion.

SECT. II.

Nature is not chargeable with Cruelty in the Wars ſhe excites amongſt Animals.

BUT you will object, thus to expoſe one animal to the fury of another is cruel. It is cruel above all to lay mankind under the neceſſity of deſtroying, or rendering each other miſerable. The lot of animals would doubtleſs be deplorable were they endowed with reaſon, like ourſelves, and could they foreſee at a diſtance the evils which threaten them; but nature has cautiouſly hid theſe from their ſight, by giving them inferior degrees of intelligence. And thoſe of them which have ſo much ſegacity as to apprehend danger, are accordingly endowed with a double portion of activity and addreſs to avoid it. They have alſo their places of retreat. All theſe advantages inſpire them with confidence (*o*). Monks and women conſider the military claſs as the moſt unhappy of men, becauſe placing themſelves in their ſituation, they judge of it by their own timid diſpoſitions. Thus again, when we would judge of the ſtate of the other ſpecies, which depend upon us, we place ourſelves in the ſame ſituation, and carrying with us all our knowledge and foreſight, we conclude that they lead a

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(*o*) There are ſome animals that make uſe of centinels; and with this precaution, they will calmly venture to gather their food in the midſt of their enemies. For this reaſon have the Spaniards given the name of *Preacher* to a certain bird in South America. Wherever theſe birds flock together, one of them is always obſerved to place itſelf upon an eminence, and ſeems by the noiſe it makes, to be continually haranguing its brethren; but in fact it has only taken this ſtation to prevent any ſudden ſurprize.

miſerable life. But the truth is, being deſtined to an end different from ours, they are neither endowed with our penetration nor ſenſibility. The lamb, which the wants of its maſter condemns to bleed to day, continues neverthleſs to ſkip about, and browze the tender herb: he is happy and contented to the laſt. He careſſes the hand armed for its deſtruction; and the blow it receives comes like a thunderbolt, unexpectedly falling upon ſome devoted head (*p*).

With reſpect to wars, we have already obſerved that nature has mitigated their horrors by intermixing with the alarms they create in the mind, the ſentiments of anger and revenge, or a thirſt for glory, that danger awakens, and that ren-

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(*p*) The lamb thy riot dooms to bleed to day,
Had he thy reaſon, would he ſkip and play?
Pleas'd to the laſt he crops the flow'ry food,
And licks the hand juſt rais'd to ſhed his blood.
Pope's Eſſay on Man, ep. 1. l. 81.

ders men ſuperior to all the evils wars bring with them. But after all, if they prove the occaſion of wretchedneſs to ſome, the miſery of ſuch is no more according to the intention of Providence, than the pain which accompanies any operation upon the human body, is in that of the ſurgeon. They are no more than victims, which, after having enjoyed their portion of the ſweets of life, ſuffer for the general good. Things, according to the actual ſtate of affairs, cannot be otherways. Should any one ſtill doubt of this, let him reflect that the law of propagation reſpects men as well as other animals, and let him conſider the effect which this law neceſſarily produces. I ſee no neceſſity, you ſay, why animals ſhould devour each other, much leſs that men, in whatever circumſtances they may be placed, ſhould mutually take up arms to deſtroy each other. Well then, aboliſh this law of nature, and revive in your imagination the golden age of the poets. Let univerſal peace and harmony ſucceed to thoſe wars, which inceſſantly diſturb the repoſe of nations; let ſwords be changed into plow-ſhares, and ſpears into pruning-hooks: inſtead of ſtaining the earth with human gore, let them ſerve to render it as fertile as poſſible. Let ravenous beaſts, forgeting their natural fierceneſs, ceaſe to perſecute the other ſpecies, and uſing their teeth to crop the graſs, let them browze in the meadows with ſheep and goats. In a word, let all the animals enjoy a profound peace: let them with one accord, and in perfect ſecurity, make the foreſts and mountains reſound with the praiſes of their Creator. Aye, this you ſay is the ſtate in which the world ought to be, and in which it would have been if——— Senſeleſs and ſtupid mortal! Ye would remove trifling evils, and you introduce the moſt enormous! Ye would preſerve ſome uſeleſs individuals, and ye deſtroy the whole! As each ſpecies would no longer experience the obſtacles proportionate to the effects of their increaſe, a univerſal inundation would enſue, threatening ſpeedy deſtruction to the whole animal ſyſtem. This perfect calm, this univerſal and uninterrupted felicity they wiſh to introduce into the world; this beautiful chimera, will always appear poſſible to thoſe who judge of things according to their imagination only; but every one that forms a right judgment, will ſee that the earth was never deſigned for ſuch a ſtate.

SECT. III.

The Law of Multiplication is abſolutely neceſſary in the Animal Syſtem.

BUT if theſe are the conſequences that neceſſarily follow the law of multiplication, why (it may be objected) does ſuch a law exiſt?

1ſt, Becauſe it introduces into the world a much greater abundance of life than what could otherwiſe take place. The carnivorous animals could not ſubſiſt without the frugivorous, and theſe would be extinguiſhed by the depredations of the other ſpecies, were they not remarkably prolific. But let us place this ſubject in a ſtronger point of view.

2dly, Without this law of multiplication animal life cannot exiſt, or could exiſt for a ſhort period only. Life is no other than a web of curious contexture, wrought with ſoft, weak, fragile, delicate materials, forming all together a piece admirable in its conſtruction and deſtination, but for this very reaſon ſubject to ten thouſand accidents. To imagine that life could ſubſiſt without ſuch an aſſemblage, is to confound it with the exiſtence of pure intelligences: to imagine that Beings formed upon theſe principles, could perpetuate their own exiſtence without ſucceſſive generations, is to attribute to them contradictory qualities. Poets have dreamed of deities, who, though furniſhed with arms, legs, and in ſhort, with a body ſimilar to the human, are yet deſtitute of human blood, and can exiſt without the ſame kind of nouriſhment (*q*). Fabuliſts, on the other hand, have formed of human fleſh and blood invulnerable, inviſible, immortal beings; but they have exceeded the productions of the Omnipotent. He has formed all the inhabitants of the world from the duſt of the earth, and until He may think it proper to change their natures they muſt inevitably return to duſt. Mortal and corruptible, they cannot, at the ſame time, be immortal, incorruptible.———Sovereign wiſdom might have introduced a gigantic race into the animal ſymſtem, againſt whom all created powers might in vain have exhauſted their

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(*q*) Οὐ γὰρ σῖτον ἔδουσι οὐ πίνουσι αἴθοπα οἶνον
Τοὔνεκα ἄναιμονές εἰσι καὶ ἀθανατοι καλέονται. Hom. Il. E.

fury. A race whom our ſeas could not overwhelm, nor our mountains bury under their enormous bulk. But ſuch a race would neceſſarily require a world large in proportion, or it could not contain them. Whatever ſize therefore we may attribute to the individuals of the animal ſyſtem, it muſt be as nothing compared to the world they inhabit; and their power compared with ſecond cauſes, which animate the world, muſt be as leſs than nothing.

Animal life, therefore, neceſſarily ſuppoſes beings that cannot perpetuate themſelves without re-production in ſucceſſive generations. And as they are expoſed to numberleſs diſaſters, which might ſweep away multitudes before they had obeyed the laws of nature in this reſpect, it is requiſite that their re-production ſhould be more than ſimple. Was it the eſtabliſhed order that no more than two ſhould ſpring from two, it is evident that ſuch a number would not be ſufficient to perpetuate any one of the ſpecies. For it is natural to imagine, that ſome time is to elapſe betwixt the birth of an individual, and its re-production; but ſhould they be deſtroyed during this interval, the loſs of the ſpecies would be irreparable: and as theſe loſſes would unavoidably be repeated, they muſt, at length, occaſion the extinction of the whole race. There is no danger of exaggeration in aſſerting, that it is neceſſary that ſuch a re-production ſhould be ſix, ten, a hundred fold, or ſometimes more, according to the nature of the ſpecies, and the particular circumſtances of their ſituation; that the generation it produces ſhould follow each other in ſwift ſucceſſion, ſo that whenever any ſpecies ſuffers a conſiderable loſs, by thoſe cataſtrophes which happen in the world, it may be ſpeedily recruited, and leave no void in the ſcale of exiſtence. This alſo ſhews the intention of Providence in confining the exiſtence of every individual within ſuch contracted limits.

For as the natural frailty of animal life renders the increaſe of individuals neceſſary, this increaſe makes it neceſſary in return to ſhorten the ſpace of their exiſtence. For ſhould it extend beyond a certain term, it is plain that this law of multiplication would prove, for the moſt part, too luxuriant in its effects, that is, it would produce pernicious effects. Tho' the devaſtations which war, diſaſters, diſeaſes, infirmities, occaſion, are at certain ſeaſons immenſe, and more than what is requiſite to check the undue increaſe of any ſpecies, there are other ſeaſons in which they produce not theſe effects. And ſince Providence governs the world by general laws, ſince the events which take place in it cannot contradict theſe laws, but prove ſubordinate to them, it is neceſſary, beſides the coercive laws which oppoſe this undue increaſe of the ſpecies, that there ſhould be ſome general one which limits the exiſtence of every being to a certain period. The law of multiplication,

plication, and ſuch a period of exiſtence as would render this multiplication exceſſive, are abſolutely incompatible. It is alſo probable (obſerving a diſtinction however betwixt terrene and aquatic animals) that the term of exiſtence natural to each being, is according to the produce of this multiplication compared with the time allotted for its repetition. Providence has permitted but a few moments of exiſtence to thoſe inſects which are hourly renewing their generations. Thoſe quadrupeds and birds that ſoon become capable of propagation, arrive at the end of their courſe by the time that other ſpecies, leſs prolific, have ſcarce entered upon theirs. This law is particularly obvious in domeſtic animals. The canine race, cats, hogs, ſeldom exceed a dozen years, whilſt horſes, aſſes, cows, live, according to the common courſe of nature, to a much longer period. Men, who require a certain number of years before they are ripe for propagation, and conſequently multiply ſlower, enjoy a much longer extent of exiſtence than is granted to almoſt any other animated being.

SECT. IV.

Advantages reſulting from the Law of Multiplication.

LET us make one obſervation more upon this law. As it maintains life in all its plenitude, ſo does it multiply the pleaſures of life. By what other name ſhall we call thoſe tender affections, and thoſe returns of tenderneſs ſtill more endearing, which all experience that are under its dominion. It enkindles warm deſires in the heart, but theſe very deſires render the heart ſuſceptible of higher degrees of felicity. They are the parents of pleaſing illuſions, which raiſe weak and feeble mortals to the rank of gods! From hence ariſe looks full of tenderneſs and love; attachments the moſt ſincere and difdiſintereſted; mutual intercourſes which are the delights of life; and hopes that are its chief ſupport and ſovereign balm. It is, I acknowledge, the parent of cares alſo; but it renders even theſe pleaſing and delightful by the tender concern it inſpires for the happineſs of thoſe who are the objects of them: and where it expoſes to troubles, it renders them ſupportable by the advantages that reſult from them. Can any thing be more delightful than the connection eſtabliſhed betwixt animals of the ſame ſpecies? From hence thoſe bonds of love uniting individuals together, ſo as to render them as one; from hence the reciprocal intercourſe of aſſiſtance, conſolation, offices of friendſhip on one ſide; and, on the other, gratitude, eſteem, and love. Let us never complain of nature: all her laws are formed for our happineſs; but this is the more immediate characteriſtic of that law which enjoins the multiplication of the individuals of each ſpecies. Through its benignant influences, men, as well as the reſt of the animal creation, forget their pains, forget their weakneſs; frequently does wretched man forget the miſeries of his ſtate, and compare his felicity with that of angels!

In ſhort, the deſires and hopes which are implanted by this law are, as we have juſt obſerved, the ſovereign balm and ſupport of life. Of what are not thoſe capable who are animated by their influence? They give ſtrength to the weak, courage to the timorous, activity to the indolent: they tame the ſavage, and inſtamp a degree of fierceneſs upon the moſt placid natures: in a word, they mingle with all the paſſions of the mind, and communicate to them a certain dignity and grandeur. They have produced, amongſt the human race, the moſt heroic actions; and where they may not be the immediate cauſe of the moſt ſhining virtues, they have at leaſt a peculiar influence in diſpoſing the mind to perform them. There is a certain period of life when the minds of men are unuſually open to the feelings of benevolence, generoſity, and compaſſion, and it is when this law reigns with ſovereign power in the heart. There is a ſeaſon, when the heart of man contracts, when its nobleſt efforts do not exceed the performance of ſome partial virtues; it is when this delightful flame begins to be extinguiſhed.

SECT. V.

General Reflections upon what has been advanced.

WE cannot doubt but that whatever the Deity has done, is well done. We acknowledge this truth, not becauſe others have acknowledged it before us, but becauſe it ſhines with unclouded luſtre in that order and beauty which reign in the ſyſtem of the univerſe, and becauſe this homage is due to him whom we believe, and who is in fact Supreme Goodneſs itſelf.

There is a certain determined end in which all the deſigns of nature are centered; this is the production and conſervation of life; and all beings agree to acknowledge that life is a bleſſing. Thoſe ſigns of joy and gaiety, manifeſt in all their motions, in every attitude, and in every tone of voice, prove that life has its ſweets for all, even the loweſt claſs of animals, and that they are capable of enjoying them. Men in particular do juſtice in this reſpect to the gift of their Creator: they love the life he has conferred, and watch over it as their greateſt good. If there are ſome ulcered ſouls that regard it as a burden, and delight to repreſent it in this view, their judgments ought not to counterbalance that of mankind in general; their voice ſhould not ſilence the voice of nature. Let them compare the ſeaſons of health with thoſe of ſickneſs; the moments of pain to hours of eaſe and pleaſure; the days of bitterneſs and woe to thoſe in which they are free from their attack; let them confront the few unfortunate with the thouſands of millions of happy creatures, and then decide whether the meaſure of happineſs does not greatly exceed that of miſery. Life, we ſay, is a bleſſing; and it is the will of the Creator that innumerable multitudes enjoy this bleſſing. Amidſt a variety of other worlds, he has created this we inhabit. A world diverſified with mountains and plains, refreſhed with rivers and lakes, enriched with plants and trees, warmed and enlightened by the rays of the ſun: a world, where inviſible cauſes preſerve, in perpetual circulation, the elements impregnated with every principle of life; where the vegetables, by ſecret powers ſtill more myſterious, attract and collect theſe rich treaſures of the elements, and prepare them for the ſupport of the animal creation: a world, where (ſuch is the infinite variety and number of the ſpecies) every thing is converted into a living ſubſtance, as it were, and where all ſecond cauſes, every event, and every being, are, by eternal and immutable laws, rendered ſubſervient to the production and preſervation of life: where, if the ſpecies multiply, it is ſpeedily to repair the loſſes to which their frailty expoſes them; if they deſtroy each other, if the term of their exiſtence is confined to certain limits, it is to prevent their increaſe from becoming exceſſive. In a word, the grand object which the whole plan of nature has in view, is the plenitude and ſupport of the animal ſyſtem. There are general laws which impel every claſs of beings to promote this deſign; and theſe laws are ſo intimately connected, that they are neceſſarily productive of each other.

It is alledged, that there are contradictions in the plan of Providence. But if the end propoſed be ſuch as we have repreſented, certainly ſhe could not have choſen one more worthy of her; nor could ſhe employ more efficacious means fully to accompliſh this end, than thoſe we have aſcribed to her, and which are obvious to every one that contemplates her works. In which then do theſe contradictions conſiſt? If there is a contradiction in the animal ſyſtem, it is centered in man, to whom God has given underſtanding to know, reaſon to diſcern, and a heart to love the truth, though he turns from her every time ſhe appears before him: it is, that thoſe who are appointed by divine and human laws, to apply themſelves to inveſtigate the truth, and advance her intereſt, ſhould keep her priſoner, and never ſhew her to the public, but through the bars of hypocriſy and diſſimulation, as if ſhe were a haughty and deſtructive tyrant: it is, that there are men mild, affable, benignant in their diſpoſitions, that will pardon guilt, but are implacable to thoſe who dare ſhew them the truth. Theſe are contradictions that embarraſs us, or we ſhould find nothing in the animal ſyſtem but ſubjects for admiration and gratitude.

Many have undertaken to explain the origin of phyſical evil in the world, and it is acknowledged they have treated this ſubject with much perſpicuity, penetration and care; yet after all, the principal queſtion remains unreſolved, which is, to reconcile certain appearances in nature, with our ideas of infinite wiſdom and goodneſs. Diſcuſſions of this kind are like calculations in algebra or arithmetic; a miſtake in the denomination of a ſingle term will always render the concluſion falſe, however juſt the reaſonings may otherways be upon which this concluſion is founded. Without attending to the general good reſulting from a certain arrangement in the animal ſyſtem, they have called that evil which is not ſo: and as they have thought themſelves warranted to aſſert, that a being ſupremely excellent cannot be the author of evil, they have taken infinite pains to reconcile its introduction into the world with the perfections of the Divine Nature. But inſtead of removing, they have only increaſed the difficulties. Some have imagined two principles, the one good, the other evil; others, which amounts to the ſame, have ſuppoſed that thoſe rebellious and daring ſpirits the Scriptures repreſent as bound in chains of darkneſs, ſtill retain ſufficient power in the world to trouble its repoſe, in ſpite of Omnipotence. Others again, unwilling to deprive the Deity of the glory of governing the world alone, have repreſented him as a powerful, abſolute Being indeed, but deficient in mercy, penetration, and uniformity of conduct: as a Being that was diſappointed of his end in the creation of the world, and therefore determined to curſe it, and ſubject it to an infinitude of evils.

Y.N.

evils. Others have thought to juſtify the Creator, by laying the whole blame upon his creatures, not conſidering that, according to their own ſentiments, all things are from him, by him, and to him. All theſe abſurdities demonſtrate how neceſſary it is to ſtudy nature in the book of nature itſelf; and to form our judgment of beings, and of things, upon the ends and relations which are obſervable in nature, and upon theſe alone.

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